Risk Assessment Report
(Revision 1)

Organizational Maintenance Shop #28

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Prepared for:
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LIST OF ABBREVIATIONS AND ACRONYMS

ADAF	age-dependent adjustment factor
ADEM	Alabama Department of Environmental Management
AECOM	AECOM Technical Services, Inc.
AFB	Air Force Base
ALARNG	Alabama Army National Guard
ARAR	applicable or relevant and appropriate requirements
ARNG	Army National Guard
BAF	bioaccumulation factor
bgs	below ground surface
BRA	baseline risk assessment
BW	body weight
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COC	chemicals of concern
COPC	chemical of potential concern
COPEC	chemicals of potential ecological concern
CSM	conceptual site model
DoD	Department of Defense
EPC	exposure point concentration
EPD	exposure pathway diagram
ERA	ecological risk assessment
ERAGS	Ecological Risk Assessment Guidance for Superfund
ESV	ecological screening value
FMS	Field Maintenance Shop
FS	feasibility study
GCAL	Gulf Coast Analytical Laboratories, Inc.
GI	gastrointestinal
HHRA	human health risk assessment
HI	hazard index
HQ	hazard quotient
IPaC	Information for Planning and Consultation
IUR	inhalation unit risk
kg/day	kilograms per day
LOD	limit of detection
LOAEL	lowest-observed-adverse-effect level
MAA	Mobile Airport Authority
MCL	maximum contaminant level
MDL	method detection limit
µg/L	micrograms per liter
µg/m^3	microgram per cubic meter
mg/kg	milligrams per kilogram
msl	mean sea level
NOAEL	no-observed-adverse-effect-level
OMS	Organizational Maintenance Shop
PCE	tetrachloroethene

RA	risk assessment
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentration
RfD	reference dose
RI	remedial investigation
RL	reporting limit
RME	reasonable maximum exposure
RSL	regional screening level
RSV	refinement screening value
SAIC	Scientific Applications International Corporation
SF	slope factor
SLERA	screening-level ecological risk assessment
SMDP	scientific/management decision point
SQL	sample quantitation limit
SSSL	site-specific screening level
TCE	trichloroethene
TCL	target compound list
trans-1,2-DCE	trans-1,2-dichloroethene
TRV	toxicity reference value
UCL	upper confidence limit
UPF-QAPP	Uniform Federal Policy-Quality Assurance Project Plan
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank
VDEQ	Virginia Department of Environmental Quality
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compound

1.0 INTRODUCTION

This report presents the results of the risk assessment (RA) conducted at the Alabama Army National Guard (ALARNG) Organizational Maintenance Shop #28 (OMS #28) located at the former Brookley Air Force Base (AFB). AECOM Technical Services, Inc. (AECOM) was contracted by the U.S. Army Corps of Engineers (USACE), Mobile District under the Contract Number W90FYQ-10-D-0010, Task Order No. CK02, to conduct the RA.

1.1 PURPOSE AND SCOPE OF WORK

The scope and objectives of the RA were initially presented in a Uniform Federal Policy Quality Assurance Project Plan (UPF-QAPP) Work Plan prepared by AECOM and submitted to the Alabama Department of Environmental Management (ADEM) in January 2016. An addendum to the UFP-QAPP Work Plan, Appendix D, was submitted to ADEM in January 2018.

The human health risk assessment (HHRA) was conducted to evaluate potential risk to human receptors at the site using a five-step, risk-based process:

1) Selection of chemicals of potential concern (COPCs)
2) Identification of exposure point concentrations (EPCs)
3) Calculation of risks and hazards
4) Development of site-specific screening levels (SSSLs)
5) Comparison of EPCs to SSSLs.

The ecological risk assessment (ERA) consisted of the first three steps of the United States Environmental Protection Agency (USEPA) ERA process, including a screening-level ERA and the initial step of the baseline ERA.

The RA is presented in three additional sections. Section 2 describes Data Collection and Evaluation, including the data used for the RA, how they were grouped by location and medium, and how they were evaluated for use in the RA. Section 3 is the HHRA, and Section 4 is the ERA.

The purpose for conducting this risk assessment report is to update the risk estimates (from the 2013 Remedial Investigation/Baseline Risk Assessment (RI/BRA) – Scientific Applications International Corporation [SAIC], May 2013) using current data. This information will in turn provide the basis for re-evaluation of the alternatives recommended in the Feasibility Study (FS) (Leidos, 2014).

1.2 SITE LOCATION AND DESCRIPTION

OMS #28 is located in Mobile County, near downtown Mobile at 1622 South Broad Street, between U.S. Interstate Highway 10 (I-10) and Mobile Bay (**Figure 1**). The property is relatively flat with an elevation of approximately 20 to 30 feet above mean sea level (msl). The OMS #28 site is bordered by undeveloped land and I-10 to the west; residential property to the north, the OMS #28 shop and Fort Floyd A. McCorkle Army National Guard (ARNG) facility building to the east; and commercial and industrial properties to the south (**Figure 2**). The vegetative cover consists of mainly oak trees, scrub, brush, and grasses. The nearest residential structure is approximately 150 feet northeast of the OMS #28 building.

OMS #28 is located in the northwest corner of the former Brookley AFB. The former AFB is now the Brookley Aeroplex. The initial 1,000 acres were acquired by the Department of Defense (DoD) in 1938 with additional land acquisitions through 1955 for a total of 3,156 acres. Brookley AFB was operated by the Air Force as a general support and supply base until June 1969 when it was officially closed. The DoD returned Brookley AFB to the city of Mobile and the city created the Mobile Airport Authority (MAA) in 1972. Facilities at the Brookley Aeroplex include runways and maintenance areas for aircraft, underground and aboveground fuel storage facilities, associated buildings, roads, housing and landfills. No human consumption or agricultural wells are located within the boundaries of the Brookley Aeroplex. The Brookley Aeroplex is used currently as an industrial complex and airport by the MAA (SAIC, May 2013).

Currently, the Alabama Armory Commission owns the 5.9 acres of property on which OMS #28 is located, and ALARNG operates the Field Maintenance Shop (FMS) (formerly known as the OMS). The Alabama Armory Commission has owned this property since 1953 when the City of Mobile conveyed 25.66 acres to the Commission. In 2002, 6.43 acres west of the OMS #28 property reverted back to the City and the City subsequently conveyed the property to the MAA (SAIC, May 2013).

It should be noted that the ALARNG renamed OMS #28 to FMS #28 several years ago; however, the Site is referred to as OMS #28 in all previous ALARNG, ADEM, and USACE investigation reports; therefore, to avoid confusion, the Site is referred to herein as OMS #28. According to ALARNG personnel, Site operations have not significantly changed since conversion to FMS #28 (Louis Berger, August 2015).

1.3 SITE BACKGROUND AND HISTORY

The Site has undergone numerous development, redevelopment, and organizational periods since initial development. The original/former OMS #28 building was constructed in the early 1950s and the original OMS #29 building was constructed in the 1960's. Operations and nomenclature of these facilities consolidated when the current OMS #28 building was constructed in 1978. The original/former OMS #28 building was used for storage from 1978 until demolition in 2001. Operations within the former OMS #29 were also transferred to the new OMS #28 building and the old OMS #29 building was used for storage and eventually demolished. The current OMS #28 building was expanded in 1994 to accommodate a greater volume of work. Currently, the OMS #28 building is used for vehicle staging, vehicle maintenance, and direct support for military police, medical, signal, communications, and field artillery units (Louis Berger, August 2015).

A wash pad was formerly operational in the far northwestern corner of the parking lot until 1978. The wash pad was constructed as a concrete slab with no drainage system in place. Military vehicles were routinely washed in this area and wash water was allowed to flow freely onto the ground.

Four underground storage tanks (USTs) were removed from three separate locations (i.e., Pit 1, Pit 2, and Pit 3) at the Site in October 1992. Upon removal of a single 2,000-gallon gas/diesel UST at Pit 2, petroleum-related soil and groundwater contamination was identified; however, a preliminary sampling effort was unable to determine the nature and extent of the contaminants. Additional investigation in December 1994 reportedly completely delineated the extent of petroleum-related soil and groundwater contamination associated with Pit 2. Quarterly groundwater monitoring for petroleum-related contaminants began in 1995 and continued through 2004. Further Site characterization was deemed necessary and was performed in 2004 and 2005 when analysis of quarterly groundwater sampling results indicated that petroleum contamination had migrated beyond the original monitoring well network installed during the initial 1994 groundwater investigation. This supplemental work consisted of the installation of additional monitoring wells at the Site, in attempt to delineate petroleum contamination associated with Pit 2 (Louis Berger, August 2015). The investigation area and relevant historical features are depicted on **Figure 2**.

In March 2005, trichloroethene (TCE) was detected at the Site for the first time in monitoring well MW-8. The presence of TCE in MW-8 was determined to be unrelated to the petroleum tanks that were removed from the Site in 1992; however, the source of TCE was unknown. In April 2007, TCE-contaminated soil was discovered in discrete potential source areas within the TCE, and later tetrachloroethene (PCE), plumes. Installation and sampling of additional monitoring wells was conducted in November 2008 in order to delineate the horizontal and vertical extents of TCE and PCE groundwater contamination at the Site (Louis Berger, August 2015).

Historically, TCE was documented at concentrations as high as 11 micrograms per liter (µg/L) at off-site monitoring well MW-10 and 63 µg/L at MW-11 in 2006. These monitoring wells were installed northwest of the Site, on private residential property. Monitoring wells MW-10 and MW-11 were subsequently abandoned in 2008 at the property owner's request and have not been replaced (Louis Berger, August 2015). Based on contemporaneous analysis of the 2010 groundwater data, the groundwater flow direction did not appear to indicate that the plume was or would impact the residential properties to the north of the OMS #28 building. These residential properties were thought to be side and/or up gradient of the source and groundwater flow direction.

Groundwater compliance monitoring was conducted at the Site in December 2008, May 2009, September 2009, March 2010, and September 2010 at monitoring wells MW-5, MW-6, MW-8, MW-9, MW-12, and OMS-28-1 through OMS-28-7. The monitoring effort was implemented to document and monitor groundwater conditions at the Site (Louis Berger, August 2015).

Initially, the OMS #28 chlorinated solvents plume was following a Resource Conservation and Recovery Act cleanup path due to the actions required following the discovery of TCE under the UST regulatory requirements. In September 2010, ALARNG submitted a request to ADEM to continue the activities at the site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). At the time, ALARNG was in the process of having an Alabama Risk-Based Corrective Action Report prepared and recommended using the existing data to develop an RI/FS. ADEM concurred with this approach in e-mail correspondence dated September 9, 2010 (ADEM, September 2010).

An RI, prepared by SAIC, reported a groundwater plume of TCE above the USEPA Drinking Water Maximum Contaminant Level (MCL) occurring across the Site and adjacent properties within the shallow surficial aquifer. A smaller PCE plume was also reported within the larger TCE plume boundary occurring on the MAA property. The RI also noted that the horizontal extent of the TCE boundary in the area of the residential properties, as well as the vertical delineation of the groundwater plume had not been fully investigated (SAIC, May 2013).

Based on the compilation of data reported in the RI, an FS was prepared, which recommended biological/chemical treatment of groundwater and the excavation of soils at the site. The recommended alternative included the proposed injection of an emulsified vegetable oil substrate package or other carbon source for treatment of groundwater until the MCLs for TCE and PCE are achieved. To expedite the remedial timeframe following injection, this alternative also included the excavation of the residual soil mass that is acting as a continuing source for groundwater contamination; and transportation of the resulting waste to a permitted municipal solid waste landfill for disposal (Leidos, 2014).

Based on the investigative work completed prior to 2015, the potential source area for the TCE plume appeared to be in the vicinity of monitoring well MW-8, which corresponds with the largest suspected area of residual soil contamination. Monitoring well MW-8 is located near the former wash pad along the westernmost Site boundary, in an area where military vehicles and equipment are currently stored. PCE groundwater contamination appeared to be limited to the area surrounding monitoring well OMS-28-5, which is located within a densely wooded area west of the Site. It was noted during a site reconnaissance performed by Louis Berger in 2015 that in the 1960s and 1970s “Gunk” Energized Electric Motor Contact Cleaner was used as a cleaning agent. According to a retired ALARNG employee, “Gunk” was used during the same time period as the wash pad; however, there is no official record of “Gunk” being used in the vicinity of the wash pad (Louis Berger, August 2015). According to Material Safety Data Sheets, “Gunk” cleaners may contain up to 90-100% PCE. Other information provided in the Historical Research Study Report (Louis Berger, August 2015) indicates that a racetrack was located on Parcel F (adjacent to Parcel A).

In order to implement the recommended alternative in the FS, additional refinement of the Site’s conceptual site model (CSM) was required. AECOM was contracted to conduct a supplemental data gap investigation and groundwater monitoring event in order to determine if other soil source areas were contributing to groundwater contamination and to improve the delineation of the known groundwater contaminant plume (AECOM, January 2019). Please refer to the supplemental data gap report for information on the delineation of the soil source areas and groundwater contaminant plumes. The data used for this Risk Assessment Report were generated as part of this supplemental data gap investigation.

2.0 DATA COLLECTION AND EVALUATION

2.1 DATA COLLECTION

Data used in this risk assessment were collected between January 2016 and February 2018 and were analyzed for volatile organic compounds (VOCs). Soil data were collected in May 2017 from 31 locations across the area of investigation at three depths:

- surface soil (0 to 1 foot below ground surface [bgs]),
- area of highest VOC concentrations (which was identified by field equipment), and
- 1 foot above the soil/water interface, generally between 4 to 7 feet bgs.

The soil samples were analyzed by an on-site mobile laboratory, Columbia Technology, LLC, for PCE and TCE via USEPA Method SW8260B. As a quality check, split samples were collected at a frequency of 10% of the total soil samples and sent to an off-site fixed laboratory, Gulf Coast Analytical Laboratories, Inc. (GCAL), for analysis of target compound list (TCL) VOCs by USEPA Method SW8260B. Of the 93 total soil samples collected, nine were analyzed for full TCL VOCs, and 84 were analyzed only for PCE and TCE.

USEPA Region 4 generally considers soil from 0 to 1 foot bgs as surface soil and soil from depths greater than 1 foot as subsurface soil (USEPA, March 2018a). Therefore, the soil samples collected in this investigation from 0 to 1 foot bgs are considered surface soil, and samples collected below 1 foot bgs are considered subsurface soil.

Groundwater data were collected from 11 monitoring wells in January 2016 and again in May 2017 and were analyzed by GCAL for TCL VOCs using USEPA Method SW8260B.

In May 2017, discrete groundwater grab sampling was conducted, with locations selected based on the results of prior investigations, monitoring well analytical data results, and discrete groundwater analytical results provided by the on-site mobile lab during the investigation. Collected groundwater samples were analyzed by the on-site mobile laboratory, Columbia Technologies, LLC, for TCE and PCE via USEPA Method SW8260B. As a quality check, split samples were collected at a frequency of 10% of the total groundwater samples and sent to GCAL, for analysis of TCL VOCs by USEPA Method SW8260B.

In January/February 2018, a second mobilization occurred to further refine the extent of the groundwater plume. The groundwater samples were delivered to GCAL for analysis during this second discrete groundwater sampling mobilization for analysis of a refined TCL consisting of cis-1,2-dichloroethene (cis-1,2-DCE), PCE, TCE, and vinyl chloride.

A total of 226 groundwater grab samples were collected during these two events (May 2017 and January/February 2018) from multiple depths across 87 locations and analyzed for VOCs by the on-site mobile laboratory. Of these 226 individual grab samples, 49 were analyzed for cis-1,2-DCE, PCE, TCE, and vinyl chloride, and 177 were analyzed only for PCE and TCE. Seventeen of these 226 samples were also analyzed for TCL VOCs by GCAL, resulting in two results each for PCE and TCE. For these 17 samples, the PCE and TCE data from GCAL, and not from the on-site mobile laboratory, were used in the RA.

Surface water and sediment data were not collected, as no surface water bodies are located on or near the site.

The laboratory analytical data reports and data validation reports for each sample event are included in the *Supplemental Data Gap Investigation and Groundwater Monitoring Report* (AECOM, January 2019). A summary of the samples (including sample locations, depth intervals, dates collected, and analytical parameters) used in the RA is presented in **Table 1a** of this Risk Assessment Report. The locations of the soil and groundwater samples used in this risk assessment are shown on **Figure 3** of this Risk Assessment Report. The groundwater samples determined to be within the core area of the plume of VOCs at each parcel are shown in **Table 1b** and on **Figure 5**. A figure showing the nature and extent of VOC contamination in groundwater and spatial patterns with respect to the parcels is provided in the *Supplemental Data Gap Investigation and Groundwater Monitoring Report* (AECOM, January 2019).

2.2 DATA EVALUATION METHODOLOGY

The analytical data obtained from sampling efforts on and near the site were evaluated prior to use in the RA. The goal of data evaluation is to select data that are valid for use in the RA and to identify chemicals that potentially are site-related. Data selected for use in the RA include data from primary field samples with no associated qualifiers and data with qualifiers that indicate uncertainties in concentration but not in constituent identification (i.e., J-qualified data). The initial steps in identifying human health COPCs and chemicals of potential ecological concern (COPECs) involve evaluation and aggregation of data. Such steps for the evaluation of COPECs are discussed in Section 4.0.

After the analytical data were compiled, they were sorted based on medium, depth interval, and exposure area to form data groups for evaluation in the RA. An exposure area is a geographical area over which receptors are likely to average their exposures, based on observed or assumed patterns of receptor behavior and the patterns and extent of contamination. The data groups for each medium were sorted based on exposure areas to form exposure groups to be used in evaluating risk.

Based on the characteristics of this site and patterns of contamination and receptor exposure, the area of investigation was divided into the following eight parcels for evaluation:

- Parcel A - City of Mobile Water and Sewer Commission property northwest of the site
- Parcel B - residential zoned parcel northwest of the site
- Parcel C - residential zoned parcel northwest of the site
- Parcel D – residential zoned parcel northwest of the site
- Parcel E – the ALARNG OMS #28 site
- Parcel F – Mobile Airport Authority property west of the site
- Parcel G – I-10 Service Road west of Parcels A, B, C, and F
- Parcel H – private residential property east of Parcel D and north of Parcel E.

The exposure groups for these parcels included three exposure groups each for surface soil and subsurface soil (soil samples were collected only from Parcels A, E, and F), and eight exposure groups for groundwater. The parcels are shown on **Figure 3**, along with the location of each soil and groundwater sample. Groundwater locations for Parcel D include GW91, which is northeast of this parcel. Groundwater locations for Parcel E include GW86, which is just off site of the National Guard property (south of Parcel E). **Table 1a** shows a complete list of samples associated with each parcel, dates collected, depths, and analyses performed.

Additionally, VOCs detected in groundwater from the seven parcels sampled (Parcel H was not sampled) were defined as exposure groups for vapor intrusion, in which VOCs volatilize from shallow groundwater and enter buildings on the Site. Under current conditions, vapor intrusion is considered a potentially complete groundwater exposure pathway only for a resident who lives on Parcel H, the property immediately east of Parcel D. This residence is within 100 feet of the VOC plume beneath Parcel D and, therefore, is within the buffer where vapor intrusion should be evaluated (USEPA, June 2015). In this scenario, indoor air concentrations were modeled for a residence on Parcel H based on current groundwater concentrations at Parcel D.

Under future conditions, vapor intrusion is considered a potentially complete groundwater exposure pathway for an industrial worker and a hypothetical resident for all parcels, based on current groundwater concentrations measured across each parcel. The vapor intrusion pathway is of concern only for VOC contamination in shallow groundwater within 100 feet of an occupied building, and it was assumed that under future conditions, an industrial facility or a residence could be constructed and occupied on any of the seven parcels. Parcel H was assumed to remain residential in the future.

Those analytes not detected in any samples in a particular medium or exposure group were eliminated from the RA data set. Detected analytes in each exposure group are presented in **Tables 2 through 5.** Analytes were detected in surface and subsurface soil at Parcels A, E, and F, the only three parcels where soil samples were collected, and in groundwater at all seven parcels sampled (A through G).

Instances in which a chemical was not detected but its limit of detection (LOD) for that sample exceeded its screening value were assessed for their potential relevance and significance. In Parcel A soil, two samples (two separate depths at the same location) in which TCE was not detected had an elevated LOD for TCE. These samples were considered unlikely to affect the screening results given that none of the detected TCE concentrations in soil at this parcel exceeded the screening value. In groundwater, TCE and vinyl chloride were not detected in several samples in which their LODs exceeded their screening values, which were based on Regional Screening Levels (RSLs) for tapwater. However, the LODs did not exceed MCLs, which are the applicable or relevant and appropriate requirements (ARARs) for groundwater and ultimately are the basis for determining cleanup levels. Therefore, the elevated LODs in these soil and groundwater samples were not relevant or significant and did not affect the identification of COPCs in these media.

3.0 HUMAN HEALTH RISK ASSESSMENT

The purpose of the HHRA portion of a RA is to characterize the potential for carcinogenic risk and noncarcinogenic hazard to human receptors exposed to site-related constituents under current and hypothetical future land use conditions if no remedial action is performed. If a risk or hazard is determined, then SSSLs are developed for each scenario to mitigate risks. This is done by developing SSSLs for comparison to site concentrations. Constituent concentrations in environmental media measured under current conditions are assumed for the future exposure scenario.

The HHRA includes the following subsections: Identification of Chemicals of Potential Concern (Section 3.1); Exposure Assessment (Section 3.2); Exposure Point Concentrations (Section 3.3); Development of Chemical Intakes (Section 3.4); Toxicity Factors (Section 3.5); Calculation of Risks and Hazards (Section 3.6); Development of Site-Specific Screening Levels (Section 3.7); and Summary (Section 3.8).

The HHRA follows principles and procedures consistent with published USEPA guidance documents, including:

- Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part A), Interim Final (USEPA, December 1989);
- RAGS, Volume I, Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments), Final (USEPA, December 2001);
- RAGS, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final (USEPA, July 2004);
- RAGS, Volume I, Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final (USEPA, January 2009);
- Region 4 Human Health Risk Assessment Supplemental Guidance (USEPA, March 2018a); and
- OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (USEPA, June 2015).

3.1 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

Risks were calculated and SSSLs were developed only for those analytes identified as COPCs. The evaluation conducted to identify COPCs in soil and groundwater utilized a conservative screening in which the maximum measured soil and groundwater concentration of each detected analyte at each parcel was compared to a chemical-specific risk-based screening level. The chemical-specific screening levels for each medium are from the following sources:

Groundwater

- USEPA regional screening levels (RSLs) for tap water, at a risk level of 10^{-6} or a hazard quotient (HQ) of 0.1 (USEPA, November 2021a), based on exposure of residents via direct contact.

Soil

- USEPA RSLs for residential exposure to soil, at a risk level of 10^{-6} or an HQ of 0.1 (USEPA, November 2021a), based on exposure via direct contact.

An analyte was eliminated as a COPC if its maximum detected concentration was less than its RSL. However, as per USEPA guidance (March 2018a), the chemical was retained as a COPC in groundwater, if its maximum detected concentration exceeded its USEPA MCL.

Vapor Intrusion Screening

Risk-based screening levels for groundwater concentrations based on the indoor air exposure pathway were derived using the USEPA Vapor Intrusion Screening Level (VISL) Calculator, (USEPA, November 2021b). Screening concentrations were derived for both commercial/industrial and residential exposure scenarios using a groundwater temperature of 21 degrees Celsius (USEPA, September 2017a), and a target risk of 1 x 10^{-6} for carcinogens and a target HQ of either 0.1 or 1 for noncarcinogens. For parcels having only one detected chemical, an HQ of 1 was used in the calculator. For parcels having more than one detected chemical, an HQ of 0.1 was used to account for possible cumulative effects. The VISL Calculator includes those chemicals that are sufficiently volatile and toxic to potentially pose risk. That is, screening levels are calculated for chemicals that would volatilize from groundwater into indoor air and that have been identified as potentially causing carcinogenic risk or noncarcinogenic hazard through the inhalation pathway. The VOCs evaluated in the VISL calculator were those detected in groundwater samples, which would have the potential to volatilize from the groundwater and enter buildings on the Site. A VOC was eliminated as a vapor intrusion COPC if its maximum detected concentration was less than its VISL groundwater screening target concentration. The VISL calculator is presented in **Appendix A** as **Tables A-1 and A-2** for the commercial/industrial scenario based on target HQs of 0.1 and 1, respectively. **Tables A-3 and A-4** present the VISL calculator for the residential scenario based on target HQs of 0.1 and 1, respectively.

COPC Summary

The chemicals remaining in each medium and exposure group after the completion of screening constitute the human health COPCs. The COPCs identified through the methods and rationale described above are presented in **Tables 2 through 4** for surface soil, subsurface soil, and groundwater. These tables list the analytes detected in the exposure group, including their occurrence (maximum and minimum detected concentrations, location of maximum concentration), frequency of detection, range of laboratory detection limits, and screening value; and they indicate which analytes are COPCs and the rationale for their selection or deletion. **Table 5** presents the COPCs identified in groundwater for vapor intrusion based on industrial/commercial and residential scenarios. COPCs were identified in surface and subsurface soils only at Parcel A. COPCs were identified in groundwater and for vapor intrusion at Parcels A through F. COPCs identified for vapor intrusion on Parcel H were detected in groundwater on Parcel D. No COPCs were identified at Parcel G (the I-10 Service Road); therefore, this exposure group will not be evaluated further in this RA.

The following COPCs were identified:

Soil (both surface and subsurface): PCE
Groundwater – direct contact: PCE, TCE, cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride
Groundwater – vapor intrusion: PCE, TCE, trans-1,2-DCE, and vinyl chloride

3.2 EXPOSURE ASSESSMENT

This section of the HHRA addresses the potential pathways by which human populations could be exposed to the COPCs identified in Section 3.1. In identifying potentially complete exposure pathways, both current and reasonably anticipated land use scenarios were considered. In addition, hypothetical future land uses of the site and surrounding area were also considered. The exposure assessment describes exposure scenarios and develops information on exposure pathways.

Characterization of Exposure Setting

Section 1.2, Site Location and Description, describes the overall exposure setting in terms of the natural environment and land use. The description of the exposure setting provides information pertinent to the identification of potential human exposure pathways and the estimation of exposure factors for current and hypothetical future human receptors.

Potential receptors under current and reasonably anticipated future land use scenarios are industrial workers, who currently perform maintenance and office work at the ALARNG Facility (Parcel E) and could be exposed in the future if a building is constructed and regularly used as a workplace on the other parcels. Also under current and future conditions, trespassers could access all parcels from the zoned residential areas north of the site. Under current conditions, there are no residential structures located on the plume, but there is a residential home on Parcel H adjacent to Parcel D and within 100 feet of the plume. The decision was made to assume that the conditions present in the groundwater under Parcel D are also present under the residential home and to treat this as an exposure setting for the vapor intrusion/indoor air inhalation pathway only. There is currently no access to groundwater, so the other groundwater exposure routes are not assessed in the current resident scenario. While it is unlikely that future residents would be exposed to contaminated media at other parcels, a future, on-site, hypothetical resident was evaluated for all parcels to provide an upper-bound estimate of potential risk, in accordance with USEPA Region 4 guidance (USEPA, March 2018a). Another future exposure scenario evaluated was a construction worker assumed to perform excavation activities or work with underground utilities.

Identification of Human Health Exposure Pathways

Potential human exposure pathways were identified for current and potential future land uses. An exposure pathway represents the course taken by a chemical from a source to an exposed receptor. A complete pathway includes: a chemical source and release mechanism, a transport or retention medium, an exposure point where human contact with the contaminated medium occurs, and a route of intake for the chemical into the receptor at the exposure point. If any of these elements is missing, the pathway is incomplete.

An exposure pathway diagram (EPD) was developed to illustrate the potential exposure pathways for the Site. This EPD is presented graphically in **Figure 4**. In the diagram, potentially complete exposure pathways that are likely to, or could potentially, result in significant exposure for a given receptor are indicated by an “X” in the box representing that pathway and receptor. A blank box indicates an incomplete pathway in which at least one of the pathway elements is missing. The following table provides a summary of the receptors potentially occurring at each parcel under current and future land-use scenarios and includes notes explaining why a given receptor was not evaluated at certain parcels or for certain exposure pathways. A detailed description of each scenario and receptor and their associated exposure routes follows the table.

Parcel	Current Scenario				Future Scenario			
	Trespasser	Industrial Worker	Construction Worker	Resident	Trespasser	Industrial Worker	Construction Worker	Resident
A	X				X	X	X	X
B	X (2)				X (2)	X	X	X
C	X (2)				X (2)	X	X	X
D	X (2)				X (2)	X	X	X
E	X (1)	X (1, 4)			X (1)	X	X	X
F	X (1)				X (1)	X	X	X
G	X (3)				X (3)	X (3)	X (3)	X (3)
H				X(5)				X(5)

Notes:

(1) Not evaluated because no COPCs were identified in surface soil for this parcel.

(2) Not evaluated. This parcel is not within the soil source area, so surface soil samples were not collected.

(3) Not evaluated because COPCs were not identified in any media sampled at this parcel.

(4) Not evaluated because no groundwater plume is within 100 feet of the building currently used by industrial workers.

(5) Evaluated only for vapor intrusion based on groundwater concentrations beneath Parcel D.

Current Land Use Scenario

Under current conditions, trespassers, industrial workers, and nearby residents are the human receptors with a potential for exposure to site-related constituents. Adolescent trespassers are assumed to access any of the parcels (other than Parcel H) from adjacent residential areas, with potential exposure routes including incidental ingestion of surface soil, dermal absorption of surface soil, and inhalation of airborne vapors from surface soil. However, no COPCs were identified in surface soil at Parcels B through G. Trespasser exposure to subsurface soil is not considered to be a complete pathway. Groundwater exposure pathways are incomplete for the trespasser.

The only parcel on the site with an existing building used by workers is Parcel E. The OMS #28 building (the ALARNG Facility) is on this parcel and consists of office space, a break room, and vehicle bays, where routine maintenance on military vehicles is performed. One vehicle wash rack is located north of the OMS #28 building, and another is located west of the building. Potential exposure routes for industrial workers include exposure to surface soil via incidental ingestion, dermal absorption, and inhalation of airborne vapors. However, no COPCs were identified in surface soil at Parcel E. Industrial workers are assumed to have no direct contact with subsurface soil under current conditions. Potential groundwater exposure pathways are incomplete under current conditions because there are no water supply wells within a 1,000-foot radius of the site (Aerostar, March 2011), and drinking water is supplied to the area by the public water supply system. Inhalation of vapors migrating from groundwater into indoor air is considered an incomplete exposure pathway because no groundwater plume lies within 100 feet of the building. The maintenance worker who performs vehicle maintenance or uses the wash racks is not addressed as a separate receptor because the industrial worker is deemed to be sufficiently protective for on-site activities involving contact with soil at the surface.

Current residents (adult and child) may contact COPCs in groundwater through inhalation of vapors migrating from groundwater at Parcel D into the indoor air of an existing residence on an adjacent property Parcel H. Current residential exposure from direct contact with groundwater is not considered to be a complete pathway because this area is on city-supplied water. Although there are no residential structures located on the plume, there is a residential home on Parcel H adjacent to Parcel D and within 100 feet of the plume. The decision was made to assume that the conditions present in the groundwater under Parcel D may affect the residential home on Parcel H and to treat the inhalation of VOCs in indoor air due to vapor intrusion as an exposure pathway in the current land use scenario for Parcel H. Exposure of current residents to surface and subsurface soil is not assessed as there are no current residents in areas with soil contamination. Potential exposures to surface soils under current conditions are accounted for in a trespasser scenario.

Future Land Use Scenarios

Future exposures for a trespasser at Parcel A, the only parcel with surface soil COPCs identified, and a resident at Parcel H, were assumed to remain the same as under the current land use scenario. The future industrial worker could be exposed at any of Parcels A through G, assuming a new facility was to be built in any of these locations. However, COPCs in surface and subsurface soil were identified only at Parcel A. In accordance with USEPA Region 4 guidance (USEPA, March 2018a), a hypothetical on-site resident also was assumed to be a future receptor at Parcels A through H. An additional receptor with the potential for future exposure to site-related constituents at Parcels A through G was assumed to be a construction worker. As discussed previously, however, no COPCs were identified in any media at Parcel G; therefore, no future receptors will be evaluated for exposure from this parcel.

For future industrial workers, potential exposure routes to COPCs in surface soil include incidental ingestion, dermal absorption, and inhalation of airborne vapors. Industrial workers are assumed to be exposed to subsurface soil that has been excavated during construction of an industrial building and spread on the surface; potential exposure routes include incidental ingestion and dermal absorption. Additionally, there is potential exposure to groundwater through ingestion and dermal contact, assuming that groundwater would be used as a potable water source. Inhalation of vapors migrating from groundwater into indoor air is also considered a potentially complete exposure pathway at each parcel.

A future construction worker may have the potential for exposure during excavation activities at all parcels, such as during construction of a building or installation or repair of underground utilities. A construction worker engaged in such activities may contact chemicals in surface and subsurface soil through ingestion and dermal exposures, and could potentially inhale chemicals from surface and subsurface soil as airborne vapors. Construction worker exposures to groundwater also could potentially occur through incidental ingestion of, dermal contact with, and inhalation of VOCs while working in excavations that extend below the water table.

Future residents (adult and child) may contact COPCs in surface soil through ingestion, dermal, and inhalation exposure and subsurface soil through ingestion and dermal exposure (residents are assumed to be exposed to subsurface soil that has been excavated during construction of a residence and spread on the surface). It was conservatively assumed that direct exposures to site groundwater could occur through the use of an on-site well as a potable water source. Potentially complete groundwater exposure pathways for a resident include groundwater ingestion, dermal absorption while bathing, and inhalation of vapors from showering and other household uses of water from an onsite well. Additionally, inhalation of vapors migrating from groundwater into indoor air is considered a potentially complete exposure pathway.

3.3 EXPOSURE POINT CONCENTRATIONS

Human exposures were evaluated based on a reasonable maximum exposure (RME), which is the maximum exposure that is reasonably expected to occur at a site. The RME is a conservative exposure case that is within the range of possible exposures for each potentially complete pathway (USEPA, December 1989). The sampling data collected were used to calculate EPCs. The media evaluated in the HHRA are surface and subsurface soil and groundwater. USEPA Region 4 generally considers surface soil as the interval from 0 to 1 foot bgs and subsurface soil as soil from deeper than 1 foot bgs. Surface soil (0 to 1 foot bgs) and subsurface soil (1 to 6 feet bgs) collected at the site are evaluated separately. All surface soil and subsurface soil locations were used.

Individual groundwater data sets were developed for evaluating exposure through direct contact and through vapor intrusion. In order to address USEPA's recommendation to base groundwater EPCs for direct contact on data collected from "wells within the core/center of the plume" (USEPA, February 2014a), the groundwater data set for each parcel used to calculate EPCs includes only elevated concentrations from locations that make up the approximate core/center of the plume of VOC contamination for that parcel. In order to identify the core of the individual groundwater plumes for Parcels A through F, elevated concentrations of each groundwater COPC and their locations were identified for each parcel. For each parcel, the core of the groundwater plume of contamination was determined based on highest concentrations of the groundwater COPCs and their spatial proximity to one another. Groundwater locations with low or non-detected concentrations were not considered part of the core of the plume, except for the following: for locations identified as part of the core of the plume, concentrations were included from all depths sampled at that location. For monitoring well locations within the core of a plume, concentrations from both sampling events were included. The concentrations of VOCs in each groundwater sample and the rationale for including specific samples in the core of the VOC plume at each parcel are provided in **Table 1b**, and the groundwater sample locations identified as being in the core of the VOC plume at each parcel are shown on **Figure 5**. The locations, including depths, identified as being in the core of the groundwater plumes for Parcels A through F are shown below and are the same for each COPC identified for a given parcel. Parcel G did not have any COPCs identified in groundwater, and groundwater was not sampled at Parcel H.

Parcel A - OMS-28-GW19-12, -GW19-19, -GW19-30, -GW22-11, -GW22-20, -GW22-28, -GW23-12, -GW23-20, -GW23-28, -GW24-12, -GW24-19, -GW24-30, -GW39-13, -GW39-20, -GW39-28, -GW40-13, -GW40-20, and -GW40-28;

Parcel B - OMS-28-GW43-12, -GW43-20, and -GW43-28;

Parcel C - OMS-28-GW44-28;

Parcel D - OMS-28-GW46-16, -GW46-33, -GW64-16, -GW64-33, and -GW75-29;

Parcel E - OMS-28-GW32-12, -GW32-19, -GW32-31, -GW85-13, -GW85-19, -GW85-31, -GW86-12, -GW86-16, -GW86-31, and -GW87-31; and

Parcel F - OMS-28-5_050517, -5-012016, -GW18-12, -GW18-18, -GW18-30, -GW20-12, -GW20-19, -GW20-28, -GW21-12, -GW21-18, -GW21-30, and -GW51-30.

For migration of groundwater vapors to indoor air via vapor intrusion, the data set includes the COPCs at each parcel that exceed the VISL target groundwater concentration (**Table 5**). The core of the groundwater plume for each parcel, consisting of the locations shown above, was also generally considered the core of the plume for migration of groundwater vapors to indoor air. The groundwater locations screened below 26 feet bgs were not considered part of the plumes used for evaluation of vapor intrusion because of the characteristics of the stratigraphy of the soils, which have multiple confining clay lenses that inhibit upward migration of contaminants.

The EPCs used for calculating the risk from inhalation of chemicals volatilized from groundwater during construction activities were calculated using the Virginia Department of Environmental Quality (VDEQ) model for volatiles in a construction/utility trench (VDEQ, 2022). The chemical-specific factors used in the VDEQ calculations are provided in **Appendix B**.

To determine the RME concentrations of COPCs in soil and groundwater, USEPA's ProUCL Version 5.1.002 software (Singh and Maichle, 2013) was used. This program determines the upper confidence level (UCL) of the mean computation that best fits the analytical data for each COPC. ProUCL is designed to test the normality of a data set and compute a conservative and stable UCL of the true population mean while considering sample size, the distribution of the data, and the skewness of the data. ProUCL calculates UCLs of the arithmetic mean with a specific confidence level (95% or greater) using 15 computational methods for full data sets without any non-detected results and several computation methods for data sets containing non-detects, and it recommends the most appropriate UCL(s) based on the data. In identifying the appropriate data for use with ProUCL, non-detects and estimated concentrations below the laboratory detection limit were reported. ProUCL output for each COPC in soil and groundwater is provided in **Appendix C**.

Because of the uncertainty associated with any estimate of an EPC, the 95% UCL is generally used as the RME concentration. In cases where the 95% UCL exceeds the maximum detected concentration, the maximum detected concentration was used to estimate the RME concentration, in accordance with USEPA guidance (USEPA, December 1989). Also, in cases where the 95% UCL could not be calculated (e.g., due to too few detected concentrations), the maximum concentration was used to estimate the RME concentration. The EPC tables (**Tables 6 through 9**) list the following for each COPC: the arithmetic mean and 95% UCL (if calculated); the maximum detected concentration and data qualifiers; and the EPC value, EPC statistic (95% UCL or maximum), and the rationale for use of the cited statistic.

3.4 DEVELOPMENT OF CHEMICAL INTAKES

Chemical-specific intakes, or doses, were calculated for the receptors and exposure pathways identified for quantitative evaluation in Section 3.2. The development of chemical intakes is based on USEPA methodology presented in RAGS Part A, Part E, and Part F (USEPA, December 1989; USEPA, July 2004;

USEPA, January 2009) and the Office of Solid Waste and Emergency Response Directive 9285.6-03 (USEPA, March 1991).

An RME estimate of intake was developed for each exposure pathway. The RME estimate is the highest exposure that is reasonably expected to occur in a small but definable "high-end" segment of a potentially exposed population. It is derived using upper-bound values for a few of the most sensitive exposure parameters (e.g., contact rate, exposure frequency and duration) and average values for the remaining parameters (USEPA, March 1991).

The estimates of intake and dose were based on the EPCs for COPCs and on site-specific exposure assumptions developed using USEPA guidance such as RAGS Part A, Part E, and Part F (USEPA, December 1989; USEPA, July 2004; USEPA, January 2009), Exposure Factors Handbook (USEPA, September 2011), Region 4 Supplemental Guidance to RAGS (USEPA, March 2018a), and OSWER Directive 9200.1-120 (USEPA, 2014b). The exposure factors used to estimate intake and dose for the current and future trespasser, industrial worker, and resident, and the future construction worker, as well as the equations required to calculate intake and dose, are presented and defined in **Tables 10 through 16**. Chemical-specific intakes were developed for the potentially complete exposure pathways and are presented with the risk and hazard calculations (see Section 3.6, Calculation of Risks and Hazards).

Intake Parameters

The exposure factors for the trespasser, industrial worker, construction worker, and on-site resident, and the guidance on which they are based, are shown on **Tables 10 through 13** for the ingestion, dermal, and inhalation intake routes of soil; **Table 14** for ingestion and dermal intake routes of groundwater; and **Tables 15 and 16** for inhalation intake routes of groundwater. Some factors, such as body weight and averaging time, have general application across several exposure routes and receptors. Other factors, such as ingestion rate and skin surface area, are specific to the exposure pathway. Three factors are used to estimate the total time a receptor may be exposed to a contaminated medium: exposure frequency is the number of days per year that the exposure occurs, exposure duration is the number of years over which exposure occurs, and exposure time is the number of hours per day that a receptor may be exposed to a contaminated medium.

Most of the exposure parameters are standard values that are available in risk assessment guidance documents (as referenced in **Tables 10 through 16**). For example, the on-site resident receptors are evaluated based on an adult (age range from birth to 26 years) and a child (age range from birth to 6 years). The values used for the residential exposure parameters and the industrial worker exposure parameters are USEPA standard default values for the reasonable maximum exposure (**Tables 12 through 16**).

However, some parameters are derived from site-specific information and/or professional judgment regarding the specific exposure scenario. These scenario-specific exposure parameters are discussed below.

Current and Future Trespasser

Under the current and future land use scenarios, the trespasser is an adolescent of age 7 to 16 years who visits the site infrequently from nearby residential areas. Most of the exposure parameters used for the trespasser (**Tables 10 and 11**) are the RME default values recommended by USEPA. The exposure frequency of 100 days/year assumes that the adolescent trespasser visits the exposure area approximately 2 days per week for 12 months (50 weeks) of the year.

Future Construction Worker

Under the future land use scenario, the construction worker is assumed to be an adult who works performing excavation activities, such as during construction of a building or installation or repair of underground utilities. The exposure duration of 1 year for the construction worker is based on the assumed length of a construction project at the exposure area. The t-event (event duration) of 4 hours/day for exposure to groundwater assumes that the construction worker would be working in an excavated area at or below the water table for 4 hours each day, during 250 days of the 1-year project construction duration (**Tables 14 and 16**).

Intake Equations

Equations for calculating chemical intakes based on exposures to soil and groundwater and for calculating exposure concentrations based on exposure to air were obtained from RAGS Part A, Part E, and Part F (USEPA, December 1989; USEPA, July 2004; USEPA, January 2009). The equations are presented in **Tables 10 through 16**. The equations that were used for the calculation of chemical intakes include those for: ingestion of and dermal contact with chemicals in soil and groundwater, and estimation of exposure concentrations via inhalation (used for soil vapors and for inhalation of groundwater).

3.5 TOXICITY FACTORS

Toxicological data for the COPCs, including carcinogens and noncarcinogens, are presented in **Table 17**. Based on USEPA guidance (USEPA, December 2003), the most current toxicity values were obtained from the following hierarchy of sources: (1) USEPA Integrated Risk Information System, (2) USEPA Provisional Peer-Reviewed Toxicity Values Database, and (3) California Environmental Protection Agency values, Health Effects Assessment Summary Tables, Agency for Toxics Substances and Disease Registry Minimal Risk Levels, and other peer reviewed sources. The toxicity criteria provided in USEPA's RSL tables follow this hierarchy and are updated twice per year.

The toxicity criterion used to evaluate potential carcinogens is the cancer potency slope (potency factor). A potency factor is defined as the "plausible upper-bound estimate of the probability of a response (i.e., cancer) per unit intake of a chemical over a lifetime" (USEPA, December 1989). Potency factor values are specific to the route of exposure (i.e., ingestion or inhalation). The oral potency factor is the slope factor (SF), which is "an upper bound, approximating a 95% confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate [is] usually expressed in units of proportion (of a population) affected per mg/kg-day [milligrams per kilogram per day]..." (USEPA, May 2011). The inhalation potency factor, the inhalation unit risk (IUR), is "the upper bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 microgram per cubic meter (µg/m^3) in air" (USEPA, May 2011). The interpretation of IUR would be as follows: if unit risk = 2×10^{-6} per µg/m^3, this means that an individual could have, at most, a 2 in one million chance of developing cancer if exposed daily over a 70-year lifetime to 1 µg of the chemical per m^3 of air. Oral and inhalation carcinogenic toxicity data, including the SF and IUR, for the COPCs are summarized in **Table 17**.

For exposure to noncarcinogens through ingestion, the dose-response information is presented by USEPA in the form of a reference dose (RfD). The RfD is defined as “an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime” (USEPA, May 2011). For exposure to noncarcinogens through inhalation, the dose-response information is presented by USEPA in the form of a reference concentration (RfC). The RfC is defined as “an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime” (USEPA, May 2011).

Subchronic RfDs and RfCs were used to calculate SSSLs for the construction worker. These noncarcinogenic toxicity factors are generally used instead of chronic factors to evaluate shorter-term exposure, which is appropriate based on an exposure duration of 1 year for a construction worker. Subchronic toxicity factors were obtained from USEPA Integrated Risk Information System, USEPA Provisional Peer-Reviewed Toxicity Values Database, and Agency for Toxics Substances and Disease Registry Minimal Risk Levels. Oral and inhalation noncancer chronic and subchronic toxicity data, available for the COPCs, are summarized in **Table 17**.

Most oral toxicity values are derived from critical studies that use an administered dose, while a dermal toxicity value should reflect the fact that dermal exposure is a measure of an absorbed dose. Consequently, and consistent with USEPA risk assessment guidance, oral toxicity values should be adjusted from administered to absorbed doses for use in evaluating dermal toxicity. When appropriate, oral SFs and RfDs derived from a critical study that used an administered dose are adjusted using the gastrointestinal (GI) absorption efficiency (percent absorbed by the GI tract following oral intake). If the GI absorption of the chemical (from a medium similar to the one used in the toxicity value critical study) is less than 50 percent, its oral absorption efficiency (percent absorbed) was used to calculate an adjusted SF or RfD. For a chemical whose absorption is greater than 50 percent, a default value of 100 percent (complete oral absorption) was used. GI absorption values, based on USEPA recommendations of chemicals to adjust as well as their absorption efficiencies as provided in *RAGS, Part E* (USEPA, July 2004), are provided in **Table 17**. None of the oral SFs or RfDs requires adjustment. Based on the *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* (USEPA, March 2005), risk assessors should consider life-stage differences in both exposure and dose-response when assessing cancer risk resulting from early-life exposures. Age-dependent adjustment factors (ADAFs) in dose response (i.e., slope factors) have been developed by USEPA and are combined with age-specific exposure estimates when assessing cancer risks. ADAFs are only to be used for agents with a mutagenic mode of action for carcinogenesis when chemical-specific data are absent. Two of the chemicals identified as COPCs for the Site (TCE and vinyl chloride in groundwater) have been designated by USEPA as having a mutagenic mode of action for carcinogenesis (USEPA, November 2021a).

The evaluation of TCE requires the use of different toxicity values for cancer and mutagenic effects (USEPA, November 2021c). USEPA’s assessment of vinyl chloride toxicity concludes that higher cancer risks result from exposure early in life compared to exposure during adulthood (USEPA, November 2021c). Exposure factors for both of these mutagenic COPCs are provided in **Appendix D**, and the methodology required to address both of these is included in the RSL Calculator in identifying SSSLs for the adult resident exposed to both soil and tapwater.

3.6 CALCULATION OF RISKS AND HAZARDS

Risks and hazards for the COPCs identified in soil and groundwater were calculated for the receptors and exposure pathways identified for evaluation in the EPD (see Section 3.2.2) and for each parcel across the area of investigation. Human exposures were addressed based on the reasonable maximum exposure, which is a conservative exposure case that is within the range of possible exposures for each potentially complete pathway (USEPA, 1989). The risk and hazard results include estimates of the potential for excess lifetime cancer risks and noncancer health effects for the current land use and hypothetical future land use scenarios. Cancer risk and/or noncancer hazard estimates are calculated for each COPC for which toxicity values are available, Chemical-specific RME risks and hazards for each pathway are presented in **Appendix E** (**Tables E-1 through E-27**). Exposure factor tables specific to calculating exposure from dermal absorption of groundwater are provided in **Appendix B**, and risk estimation tables for chemicals with a mutagenic mode of action for carcinogenesis are provided in **Appendix D.**

Excess lifetime cancer risks reflect the incremental upper bound probability of an individual developing cancer over a 70-year lifetime from continuous, pathway-specific exposure to potentially carcinogenic chemicals. The excess lifetime cancer risk for the ingestion and dermal pathways was calculated by multiplying the daily intake by the cancer slope factor. For the inhalation pathway, the excess lifetime cancer risk was calculated by multiplying the inhalation exposure concentration by the IUR.

The carcinogenic risk estimate is generally an upper-bound estimate because the slope factor and IUR are typically derived as the upper 95th percentile confidence limit of the probability of response based on experimental animal data (USEPA, May 2011; USEPA, December1989). Thus, USEPA is reasonably confident that the "true risk" will not exceed the risk estimate derived through use of the slope factor and IUR and is likely to be less than that predicted (USEPA, December 1989). Excess lifetime cancer risks were calculated for each COPC and were also summed to calculate total risks for the ingestion, dermal, and inhalation exposure pathways for each medium.

The excess lifetime cancer risk, which describes the increased probability of an individual developing cancer from the evaluated exposure scenario over a 70-year lifetime, typically is expressed in scientific notation (e.g., 1×10^{-6}, meaning one in one million) or exponential form (e.g., 1E-6). USEPA recognizes a generally acceptable cumulative excess cancer risk range (i.e., total risk to a given receptor) of between 1×10^{-6} and 1×10^{-4} (i.e., between one in one million and one in ten thousand) (USEPA, December 1989; USEPA, March 2018a). USEPA Region 4 generally has indicated that risks falling within the range of 1×10^{-6} to1 $\times 10^{-4}$ should be evaluated to determine if risk reduction is feasible. Risk levels less than 1×10^{-6} generally are considered *de minimis*. Risks greater than 1×10^{-4} for an individual receptor, summed from all pathways, media, and routes, generally are considered significant (USEPA, March 2018a).

Noncancer hazards were evaluated by comparing the estimated intake or exposure level over a specified time period to an RfD or RfC derived for a similar exposure period. The value derived is a chemical-specific HQ. HQs were calculated by dividing the oral or dermal intake by the oral or dermal RfD, or dividing the inhalation exposure concentration by the RfC. Thus, the oral/dermal HQ is a ratio of the chronic daily intake to the RfD and the inhalation HQ is a ratio of the estimated chronic daily exposure concentration to the RfC. HQs are not an estimate of the likelihood that an effect will occur but rather an indication of whether there is potential cause for concern for adverse effects. Furthermore, the magnitude of an HQ is not a direct guide to the potential severity of effect because there is considerable variability in the derivations of RfDs and in the type and severity of critical effect on which the RfDs are based. The HQs for individual chemicals were summed for each exposure pathway to calculate a pathway-specific hazard index (HI) for each exposure route, point, and medium.

3.6.1 Soil and Groundwater Risks and Hazards Based on Direct Contact

Carcinogenic risks and noncarcinogenic hazards were developed for receptors potentially exposed to site-related contaminants identified as COPCs in soil and groundwater at all parcels of the site. As described in Section 3.2.2 (Identification of Human Health Exposure Pathways), under current land use scenarios, soil exposure pathways are considered potentially complete for a trespasser on Parcels A through G and for an industrial worker on Parcel E. The indoor-air-via-vapor-intrusion pathway is considered complete only for a current resident living in a home on Parcel H, which is within 100 feet of the groundwater plume at Parcel D. Under potential future land use scenarios, soil exposure pathways are considered complete for a trespasser, and both soil and groundwater pathways are considered complete for an industrial worker, construction worker, and resident (adult and child).

The trespasser may be exposed to COPCs in surface soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors. The construction worker may be exposed to COPCs in soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors and to COPCs in groundwater through incidental ingestion, dermal absorption, and inhalation of vapors while working in excavations that extend below the water table. The industrial worker may be exposed to COPCs in soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors and to COPCs in groundwater used as potable water through ingestion and dermal absorption. The on-site resident may be exposed to COPCs in soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors and to COPCs in groundwater used as potable water through ingestion, dermal absorption while bathing, inhalation of vapors from showering and other household uses of water from an on-site well, and inhalation of vapors migrating from groundwater into indoor air.

3.6.2 Groundwater Risks and Hazards Based on Vapor Intrusion

Indoor air concentrations were modeled based on current concentrations measured in groundwater beneath the parcels. The vapor intrusion pathway is of concern only for VOC contamination in shallow groundwater within 100 feet of an occupied building (USEPA, June 2015). Under current conditions, an existing residence is located only on Parcel H, which is a property adjacent to Parcel D and within 100 feet of the identified groundwater plume beneath Parcel D. It was assumed that under future conditions, an industrial facility or a residence could be constructed and occupied on any parcel (except that Parcel H was assumed to remain residential). The Johnson and Ettinger Vapor Intrusion model was used to evaluate the vapor intrusion pathway for a current and future resident in a home on Parcel H and for a future industrial worker and a future resident on all other parcels. Groundwater COPCs for vapor intrusion include PCE, TCE, and vinyl chloride. The vapor intrusion pathway was evaluated for both current and future on-site industrial workers and residents using version 6.0 of the Johnson and Ettinger model (USEPA, September 2017b). The predicted indoor air concentration due to vapor intrusion derived in these spreadsheets was used as the EPC for calculating risk in indoor air. Printouts from the model runs are provided in **Appendix F.1** for the individual COPCs and parcels.

Site-specific values were used as input for the model variables to the extent possible. The site-specific values used as input to the spreadsheet program for both a worker and a resident were taken from the CSM (AECOM, 2018). These inputs include depth below grade to water table and thickness of soil stratum A (2.44 meters for Parcels A through D, 1.83 meters for Parcel E, and 1.52 meters for Parcel F); soil stratum directly above the water table (stratum A for Parcels A through F); soil stratum A SCS soil type (loamy sand for Parcels A through F); average groundwater temperature (21 degrees Celsius for Parcels A through F); and a “slab-on-grade” building foundation type (found on Parcels A through F).

Default values included enclosed space floor area of 1,500 square meters, enclosed building space height of 3 meters, and indoor air exchange rate of 1.5 for the worker for all parcels. For the resident, default values included enclosed space floor area of 150 square meters, enclosed building space height of 2.44 meters, and indoor air exchange rate of 0.45. The site-specific and default values are shown on the printouts provided in **Appendix F.1**.

Receptors at Parcels A through F and at Parcel H were evaluated for the site (No COPCs were identified at Parcel G). The calculations of cancer risks and noncancer hazards are presented in **Appendix E, Tables E-1 through E-27.**

3.6.3 Summary of Risks and Hazards

Table 18 provides a summary across pathways, media, and parcels of the medium-specific risks and hazards, total risks, and total HIs for each receptor, and includes the chemicals of concern (COCs). Under a current scenario, there is no risk or hazard on any parcel. For future scenarios, some level of risk or hazard was identified on Parcels A through F. There is no identified risk or hazard for Parcels G or H under either a current or future scenario.

USEPA Region 4 defines COCs as the COPCs that significantly contribute to a pathway in a use scenario for a receptor that either (a) exceeds a 1×10^{-4} cumulative site cancer risk, or (b) exceeds a non-carcinogenic HI of 1 (USEPA, March 2018a). Significant contribution to risk is defined by USEPA Region 4 as a chemical-specific risk of 1×10^{-6} or greater (carcinogenic COC) or a chemical-specific HQ of 0.1 or greater contributing to a noncarcinogenic HI greater than 1.

Risks and hazards are discussed in the following sections for each receptor at each parcel. COCs for each medium are also identified.

Parcel A

Total cumulative cancer risk was 2×10^{-7} and total cumulative noncarcinogenic HI was 0.1 for the current and future trespasser potentially exposed to surface soil. Both values were below acceptable risk levels. No COCs were identified (**Appendix E, Table E-1**).

Total cumulative cancer risk was 4×10^{-5}, which was within the acceptable risk range, and total cumulative noncarcinogenic HI was 240, above the benchmark of 1, for a future construction worker potentially exposed to surface and subsurface soil and to groundwater in a trench. The COCs identified were PCE in surface soil and PCE and TCE in groundwater **(Appendix E, Table E-2**).

For the future industrial worker, based on potential exposure to surface and subsurface soil and to groundwater through direct contact and vapor intrusion, total cumulative cancer risk was 1×10^{-4}, which is within the acceptable risk range. The HI was 22, which is above the benchmark of 1. PCE was identified as a COC in surface soil, and both PCE and TCE were identified as COCs in groundwater **(Appendix E, Table E-3**).

A future resident was evaluated for potential exposure to surface and subsurface soil and to groundwater through direct contact and vapor intrusion. Total cancer risk for the adult was 7 x 10^{-4} and the HI was 134, both above acceptable risk levels. The HI for the child resident was 191. PCE in surface soil and both PCE and TCE in groundwater were identified as COCs for both the adult and child resident **(Appendix E, Tables E4 and E-5**).

Parcel B

A current and future trespasser was not evaluated at Parcel B because this parcel is not within the soil source area and surface soil samples were not collected.

Total cumulative cancer risk was 5 x 10^{-7}, which was within the acceptable risk range, and the total cumulative noncarcinogenic HI was 4 for a future construction worker, potentially exposed to groundwater in a trench. TCE was identified as a COC in groundwater **(Appendix E, Table E-6**).

For the future industrial worker, based on potential exposure to groundwater through direct contact and vapor intrusion, total cumulative cancer risk was 1 x 10^{-6}, which was within the acceptable risk range, and the total cumulative noncarcinogenic HI was 0.2, which is below the benchmark. No COCs were identified **(Appendix E, Table E-7**).

A future resident was evaluated for potential exposure to groundwater through direct contact and vapor intrusion. Total cancer risk for the adult was 2 x 10^{-5} , within the acceptable risk range, and HIs for both the adult and child resident were 1, equal to the benchmark. No COCs were identified for either the adult or child resident **(Appendix E, Tables E-8 and E-9**).

Parcel C

A current and future trespasser was not evaluated at Parcel C because this parcel is not within the soil source area and surface soil samples were not collected.

Total cumulative cancer risk was 2 x 10^{-7}, which was within the acceptable risk range, and the HI was 2 for a future construction worker, potentially exposed to surface and subsurface soil and to groundwater in a trench. TCE was identified as a COC in groundwater **(Appendix E, Table E-10**).

For the future industrial worker, based on potential exposure to groundwater via direct contact and vapor intrusion, total cumulative cancer risk was 7 x 10^{-7} and the HI was 0.09. Both values were below acceptable risk levels. No COCs were identified **(Appendix E, Table E-11**).

A future resident was evaluated for potential exposure to groundwater through direct contact and vapor intrusion. Total cancer risk for the adult was 1 x 10^{-5} ,within the acceptable risk range, and HIs for the adult and child were 0.5 and 0.6, respectively, both below the benchmark. No COCs were identified for either the adult or child **(Appendix E, Tables E-12 and E-13**).

Parcel D

A current and future trespasser was not evaluated at Parcel D because this parcel is not within the soil source area and surface soil samples were not collected.

Total cumulative cancer risk was 1×10^{-6}, for a future construction worker potentially exposed to groundwater in a trench, which was within the acceptable risk range. The HI was 8, which was above the benchmark. TCE was identified as a COC in groundwater **(Appendix E, Table E-14**).

For the future industrial worker, based on potential exposure to groundwater through direct contact and vapor intrusion, total cumulative cancer risk was 3×10^{-6}, which was within the acceptable risk range, and the HI was 0.4, below the acceptable benchmark. No COCs were identified **(Appendix E, Table E-15**).

A future resident was evaluated for potential exposure to groundwater through direct contact and vapor intrusion. Total cancer risk for the adult was 4×10^{-5} ,within the acceptable risk range. HIs for the adult and child were 2 and 3, respectively, which exceed the benchmark. TCE was identified as a COC in groundwater for both the adult and child resident **(Appendix E, Tables E-16 and E-17**).

Parcel E

The current industrial worker was not evaluated at Parcel E because no COPCs were identified in surface soil for this parcel, and no groundwater plume is located within 100 feet of the building currently used by industrial workers.

A current and future trespasser was not evaluated at Parcel E because no COPCs were identified in surface soil for this parcel.

Total cumulative cancer risk was 7×10^{-6} for a future construction worker potentially exposed to groundwater in a trench, which was within the acceptable risk range. The HI was 55, which was above the benchmark. TCE was identified as a COC in groundwater **(Appendix E, Table E-18**).

A current industrial worker was not evaluated, because no COPCs were identified in surface soil for this parcel, and no groundwater plume is within 100 feet of the building currently used by industrial workers. For the future industrial worker, based on potential exposure to groundwater through direct contact and vapor intrusion, total cancer risk was 2×10^{-5}, which was within the acceptable risk range, and the HI was 3, above the benchmark. TCE was identified as a COC in groundwater **(Appendix E, Table E-19**).

A future resident was evaluated for potential exposure to groundwater through direct contact and vapor intrusion. Total cumulative cancer risk for the adult was 3×10^{-4} and the HI was 19, which are above acceptable risk levels. The HI for the child resident was 24. TCE and vinyl chloride were identified as COCs in groundwater for the adult, and cis-1,2-DCE and TCE were identified as COCs in groundwater for the child **(Appendix E, Tables E-20 and E-21**). The HQ for cis-1,2-DCE is 0.1 for the child resident, and the kidney is its target organ most affected by toxic effects. No other COPC has the kidney identified as its target organ; therefore, the target organ HI for the kidney (0.1) does not exceed 1, and cis-1,2-DCE is not considered a final COC for the child resident at Parcel E based on USEPA guidance (March 2018a).

Parcel F

A current and future trespasser was not evaluated at Parcel F because no COPCs were identified in surface soil for this parcel.

Total cumulative cancer risk was 1 x 10^{-5} for a future construction worker potentially exposed to groundwater in a trench, which was within the acceptable risk range. The HI was 76, which was above the benchmark. PCE and TCE were identified as COCs in groundwater **(Appendix E, Table E-22**).

For the future industrial worker, based on potential exposure to groundwater through direct contact and vapor intrusion, total cumulative cancer risk was 3 x 10^{-5}, which was within the acceptable risk range, and the HI was 5, above the benchmark. Cis-1,2-DCE, PCE, and TCE were identified as COCs in groundwater **(Appendix E, Table E-23**). The HQ for cis-1,2-DCE is 0.4 for the industrial worker, and the kidney is its target organ most affected by toxic effects. No other COPC has the kidney identified as its target organ; therefore, the target organ HI for the kidney (0.4) does not exceed 1, and cis-1,2-DCE is not considered a final COC for the industrial worker at Parcel F based on USEPA guidance (March 2018a).

A future resident was evaluated for potential exposure to groundwater through direct contact and vapor intrusion. Total cumulative cancer risk for the adult was 4 x 10^{-4} and the HI was 27, which are above acceptable risk levels. The HI for the child resident was 36. PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride were identified as COCs in groundwater for the adult, and PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE were identified as COCs in groundwater for the child **(Appendix E, Tables E-24 and E-25**). The HQs for trans-1,2-DCE are 0.1 and 0.2 for the adult and child resident, respectively, and blood is its target organ most affected by toxic effects. No other COPC for either receptor has blood identified as its target organ; therefore, the target organ HIs for blood do not exceed 1 for either the adult or child resident, and trans-1,2-DCE is not considered a final COC for the adult or child resident at Parcel F based on USEPA guidance (March 2018a).

Parcel G

No receptors were evaluated at Parcel G, because COPCs were not identified in any media sampled at this parcel.

Parcel H

A future resident was evaluated for potential exposure to groundwater through vapor intrusion. Total cumulative cancer risk for the adult was 1 x 10^{-6} ,which was within the acceptable risk range. HIs for both the adult and child resident were 0.3, which is below the benchmark. No COCs were identified for either the adult or child resident **(Appendix E Tables, E-26 and E-27**).

3.7 DEVELOPMENT OF SITE-SPECIFIC SCREENING LEVELS

SSSLs for the final COCs in soil and groundwater were derived for the exposure scenarios identified as potentially posing a risk or hazard. Human exposures were addressed based on the reasonable maximum exposure, which is a conservative exposure case that is within the range of possible exposures for each potentially complete pathway (USEPA, December 1989). USEPA's RSL Calculator was used to calculate SSSLs when possible. For receptors and pathways not included in the RSL Calculator, standard intake and risk equations as provided in RAGS, Volume I, Human Health Evaluation Manual (Part A) (USEPA, December 1989) and subsequent USEPA risk assessment guidance were used. The risk equations were rearranged to solve for the concentration term and the calculations were performed at predetermined levels of risk or hazard. There are separate cancer and non-cancer equations used to derive SSSLs, which for carcinogens, were calculated for target risk levels of 1 x 10^{-6}, 1 x 10^{-5}, and 1 x 10^{-4}, and for noncarcinogens, were calculated for target HQs of 0.1, 1, and 3. The SSSLs for the resident child are based only on noncarcinogenic effects, which is the methodology used by USEPA for developing residential RSLs (USEPA, November 2021c). The SSSLs calculated for each receptor are presented in **Appendix G.**

SSSLs were developed for receptors potentially exposed to site-related contaminants in soil and groundwater at all parcels of the site and for the same exposure pathways under current and future land use scenarios as discussed in Section 3.6.1, for the calculation of risks and hazards. SSSLs were calculated only for COCs, those chemicals with a significant contribution to a pathway in a use scenario for a receptor that either (a) exceeds a 1 x 10^{-4} cumulative site cancer risk or (b) exceeds a non-carcinogenic HI of 1 (USEPA, March 2018a).

The Johnson and Ettinger Vapor Intrusion model was used to evaluate the vapor intrusion pathway for a current and future resident in a home on Parcel H and for a future industrial worker and a future resident on all other parcels. The spreadsheet program, which calculates risk based on an existing groundwater concentration, also calculates a risk-based groundwater concentration, which was used as the SSSL. Default and site-specific factors used in the model for calculation of risks (discussed in Section 3.6.2) were also used for calculating the SSSLs. Printouts from the model runs are provided in **Appendices F.2** (based on risk of 10^{-6}), **F.3** (based on risk of 10^{-5})**, and F.4** (based on risk of 10^{-4}), for the individual COPCs and parcels.

USEPA's RSL calculator was used to identify SSSLs (based on risk of 10^{-6}, 10^{-5}, and 10^{-4}) for the construction worker (**Tables G.1-1, G.2-1, and G.3-1**), industrial worker (**Tables G.1-2, G.2-2, and G.3-2**), and adult resident (**Tables G.1-3, G.2-3, and G.3-3**) exposed to soil for the ingestion, dermal, and inhalation routes and for the adult resident exposed to tapwater (**Tables G.1-4, G.2-4, and G.3-4**) for these same three intake routes. The climatic zone selected for use in the RSL Calculator for identifying soil SSSLs (**Appendices G.1, G.2, and G.3 Tables 1 through 3**) was that of Atlanta, Georgia, the city with climatic conditions most likely to be similar to the Site. Since the RSL Calculator does not present the option to calculate SSSLs for all receptors or media evaluated in this RA, the equations used to derive RSLs (USEPA, November 2021c) were used to calculate SSSLs for these receptors and media. The volatilization factor of 2350 m^3/kg for PCE (509 m^3/kg for the construction worker), provided by the RSL Calculator, was used to calculate the soil SSSLs by this method.

Calculation of the SSSLs (PCE and TCE) for a construction worker exposed to groundwater through ingestion, dermal absorption, and inhalation of vapors is shown on **Tables G.1-5c, G.2-5c, and G.3-5c.** In order to calculate the inhalation component of these SSSLs, the Virginia Department of Environmental Quality trench model (VDEQ, 2022) was used, which models vapor concentrations in a construction/utility trench resulting from migration from groundwater in contact with the trench. Initially, exposure factors for a construction worker were used to calculate the concentration in the air in the trench for each COPC. These calculations were done separately based on risks of 1E-6, 1E-5, and 1E-4, and HQs of 1 (**Tables G.1-6, G.2-6, and G.3-6**). These concentrations in air were then used in the trench model (**Tables G.1-7b, G.2-**

7b, and G.3-7b) to back-calculate the concentrations for each COPC in groundwater that would yield such concentrations in air. Inputs used in the trench model are shown on **Tables G.1-7a, G.2-7a, and G.3-7a**. These groundwater concentrations were used as the inhalation components in the cancer and noncancer SSSL calculations for the construction worker (**Tables G.1-5c, G.2-5c, and G.3-5c**).

Calculation of the SSSLs (PCE and TCE) for an industrial worker exposed to groundwater through ingestion and dermal absorption is shown on **Tables G.1-8c, G.2-8c, and G.3-8c**.

For a resident child, calculation of the SSSL (PCE) is shown on **Tables G.1-9, G.2-9, and G.3-9** for exposure from ingestion, dermal absorption, and inhalation of vapors from soil. Calculation of the SSSLs (cis-1,2-DCE, PCE, and TCE) from ingestion and dermal absorption of groundwater are shown on **Tables G.1-10c, G.2-10c, and G.3-10c**.

The equations and parameters used to derive absorbed dose (DAevent) for COPCs in groundwater, which is a component of the dermal intake calculation, are provided in **Appendix Tables 11 and 12** in **Appendices G.1, G.2, and G.3.** These tables are further developed in **Appendices G.1, G.2, and G.3 Tables 5a, 8a, and 10a** for the construction worker, industrial worker, and resident child, respectively. Exposure factors used in calculation of the SSSLs for the construction worker, industrial worker, and resident child are provided in **Appendices G.1, G.2, and G.3 Tables 5b, 8b, and 10b**, respectively.

A summary of the SSSLs for the COPCs in surface soil, subsurface soil, and groundwater based on direct contact and vapor intrusion is provided in **Table 19.** This table presents the EPCs, discussed in Section 3.3, the SSSLs, discussed in this section, and MCLs for groundwater COPCs, if available. Individual receptors are listed for each parcel, and the COCs are shown by medium and exposure route for each receptor.

3.8 SUMMARY

Risks and hazards were determined; SSSLs were then developed for receptors potentially exposed to site-related contaminants identified as COCs in surface soil, subsurface soil, and groundwater at eight separate parcels on and near the OMS #28 site. Potential receptors and exposure pathways were evaluated based on the current and future land-use scenarios.

<u>Current Exposure Scenarios</u>

Under current conditions, potential surface-soil exposure routes are complete for trespassers at Parcels A through G and for an industrial worker at Parcel E, where an existing maintenance/office building is located. At the three parcels from which soil samples were collected (Parcels A, E, and F), only one COPC (PCE on Parcel A) was identified based on exposure to surface or subsurface soils. Risk and hazard were calculated for a current trespasser at Parcel A but were below target risk and hazard levels. Risk and hazard were not calculated for a current industrial worker at Parcel E, since no COPCs were identified in soil at this parcel.

Inhalation of VOCs in groundwater via vapors migrating from groundwater to indoor air is a potentially complete exposure route identified only for a current resident living on Parcel H and exposed to VOCs from groundwater beneath Parcel D. Although there are no residential structures located on Parcel D, there is a residential home on Parcel H adjacent to Parcel D and within 100 feet of the TCE plume beneath Parcel D. According to USEPA guidance, a VOC plume within 100 feet of an occupied structure provides a potential exposure pathway via vapor intrusion and indoor air inhalation. Risk and hazard were calculated for a current adult and child resident on Parcel H but were below target risk and hazard levels.

Therefore, under the current exposure scenario, there is no risk or hazard identified from exposure to surface or subsurface soil or from groundwater via vapor intrusion at any of the parcels on the area of investigation.

Future Exposure Scenarios

Under future conditions, the receptors with a potential for exposure to site-related contaminants are considered to be trespassers, industrial workers, construction workers, and hypothetical on-site residents. Potential exposures to surface soil at Parcels A through G for a trespasser in the future would remain the same as under current conditions. Potential exposure pathways for future industrial workers at Parcels A through G include exposure to COPCs in surface soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors and subsurface soil through incidental ingestion and dermal absorption. Industrial workers are assumed to be exposed to subsurface soil that has been excavated during construction of an industrial building and spread on the surface. Future industrial workers also are assumed to be exposed to groundwater via direct contact (ingestion and dermal) and the inhalation of VOCs in groundwater via vapors migrating from groundwater to indoor air (vapor intrusion).

Potential exposure pathways for future construction workers at Parcels A through G include exposure to COPCs in soil and groundwater through incidental ingestion, dermal absorption, and inhalation of vapors from groundwater while working in excavations that extend below the water table.

For future adult and child residents, potential exposure pathways at Parcels A through G include exposure to COPCs in surface soil through incidental ingestion, dermal absorption, and inhalation of airborne vapors and subsurface soil through incidental ingestion and dermal absorption. Residents were assumed to be exposed to subsurface soil that has been excavated during construction of a residence and spread on the surface. It was conservatively assumed that exposures to site groundwater could occur through the use of an on-site well as a potable water source, with exposure occurring through direct ingestion, dermal contact, inhalation of vapors during showering and other household uses of water from an on-site well, and inhalation of groundwater VOCs in indoor air via the vapor intrusion pathway.

As under the current exposure scenario, there is no future risk from exposure on Parcel G, where soil samples were not collected and COPCs were not identified in groundwater, or from exposure on Parcel H. However, there is some level of carcinogenic risk and/or non-carcinogenic hazard for future receptors (construction workers, industrial workers, and/or residents) on Parcels A through F. The final COCs are listed below for each receptor:

Parcel A

Future Construction Worker - PCE in surface soil, PCE and TCE in groundwater

Future Industrial Worker - PCE in surface soil, PCE and TCE in groundwater

Future Resident Adult - PCE in surface soil, PCE and TCE in groundwater

Future Resident Child - PCE in surface soil, PCE and TCE in groundwater

Parcel B

Future Construction Worker - TCE in groundwater

Parcel C

Future Construction Worker - TCE in groundwater

Parcel D

Future Construction Worker - TCE in groundwater

Future Resident Adult - TCE in groundwater

Future Resident Child - TCE in groundwater

Parcel E

Future Construction Worker - TCE in groundwater

Future Industrial Worker - TCE in groundwater

Future Resident Adult – TCE and vinyl chloride in groundwater

Future Resident Child - TCE in groundwater

Parcel F

Future Construction Worker – PCE and TCE in groundwater

Future Industrial Worker – PCE and TCE in groundwater

Future Resident Adult – cis-1,2-DCE, PCE, TCE, and vinyl chloride in groundwater

Future Resident Child – cis-1,2-DCE, PCE, and TCE in groundwater

4.0 ECOLOGICAL RISK ASSESSMENT

4.1 THE ECOLOGICAL RISK ASSESSMENT (ERA) PROCESS

The ERA component of a BRA evaluates whether chemical stressors in the environment pose unacceptable risks to ecological receptors. The ERA identifies contaminant levels that would not pose unacceptable ecological risks and provides information for risk management decisions regarding the need for and extent of potential remedial action (USEPA, November 2001). The process followed in performing the ERA was based on the current USEPA model for conducting ecological risk assessment, as described in the *Ecological Risk Assessment Guidance for Superfund* (ERAGS): *Process for Designing and Conducting Ecological Risk Assessments* (USEPA, June 1997) and *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (USEPA, June 2001). Additional risk assessment guidance considered in developing the ERA process includes the *Guidelines for Ecological Risk Assessment* (USEPA, April 1998) and the *Region 4 Ecological Risk Assessment Supplemental Guidance* (USEPA, March 2018b).

The ERAGS process is the principal model for ERAs in USEPA Region 4. The eight steps of the ERAGS process in Region 4 are as follows:

<u>Screening-Level Ecological Risk Assessment (SLERA)</u>

Step 1: Initial Problem Formulation and Effects Evaluation

Step 2: Exposure Estimation and Risk Calculation

<u>Baseline Ecological Risk Assessment</u>

Step 3: Baseline ERA Problem Formulation

- Step 3a: Problem Formulation and Refinement Screening
- Step 3b: Additional Problem Formulation

Step 4: Study Design and Data Quality Objectives Process

Step 5: Field Verification of Sampling Design

Step 6: Site Investigation and Data Analysis

Step 7: Risk Characterization

Step 8: Risk Management

In conjunction with these steps, the ERAGS process also requires interim decisions and deliverables following several steps in the process. These scientific/management decision points (SMDPs) are defined as points in the process at which risk managers evaluate the work completed to a given step and either approve the work and the planned approach or redirect additional work (i.e., decide whether or not the ERA should continue to the next step in the process). Up to six SMDPs potentially may be incorporated into the eight-step ERAGS process, depending on the number of ERA steps required at a particular site and circumstances specific to the site. SMDPs typically occur after Steps 2, 3, 4, and 7 of the ERAGS process, with a possible SMDP within Step 3 and another after Step 5 if approval is required for needed changes to the sampling design. This ERA concludes with SMDP 2.

4.2 SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT (SLERA)

The purpose of the SLERA is to provide an initial screening to eliminate detected chemicals that are expected to pose essentially no risk to ecological receptors. The ERA consists of two phases, the SLERA followed by the Baseline ERA. In the SLERA, preliminary COPECs are identified from among the analytes detected in exposure media at the site. The SLERA is intended to address the overall protection of the habitats and associated species within the study area based on comparison of maximum detected concentrations in site media to conservative ecological screening values (ESVs). ESVs are chemical-specific media concentrations intended to be protective of a range of sensitive ecological receptors.

The SLERA serves to focus the ERA on preliminary COPECs that may have the potential to pose ecological risk so that those contaminants then may be evaluated more closely in the context of current and future conditions. The SLERA is designed to be a very conservative, screening-level evaluation so that if the assessment indicates there is no ecological risk there can be a high degree of certainty associated with that conclusion. The SLERA includes Steps 1 and 2 of the ERA process, which are described below. At the conclusion of these initial steps, a decision is made at SMDP 1 about whether additional assessment is warranted to address possible ecological concerns identified by the SLERA.

4.2.1 Step 1: Initial Problem Formulation and Effects Evaluation

The initial Problem Formulation step of the SLERA includes the evaluation and aggregation of the data collected at the site, and the identification of conservative ESVs for use in the risk calculation in Step 2.

4.2.1.1 Data Evaluation and Aggregation

As described in Section 3, site data were evaluated to determine their usability and applicability for the ERA. The potential exposure medium at the site through which ecological receptors potentially could be exposed to site-related contaminants is surface soil. This is the medium for which conservative screening values were identified to be protective of ecological receptors. There are no water bodies supporting aquatic receptors on the Site or in the vicinity; thus, exposure of ecological receptors to groundwater as a result of discharge to surface water is not expected, and groundwater is not evaluated as part of this SLERA.

4.2.1.2 Identification of ESVs

Surface soil is the medium through which ecological receptors potentially may be exposed to site-related contaminants. The preferred source for soil ESVs to be used in the SLERA screening was the latest version of the *Region 4 Ecological Risk Assessment Supplemental Guidance* (USEPA, March 2018b). Eleven VOCs were detected among the surface soil samples collected on the Site (**Table 20**). A soil ESV was not available for three of these compounds (4-methyl-2-pentanone, cyclohexane, and methylcyclohexane), so ESVs for surrogate compounds were used. The ketone 2-hexanone has the lowest ESV of the ketones with screening values in Table 3 of USEPA (March 2018b), and its ESV is expected to provide a reasonably conservative surrogate for 4-methyl-2-pentanone. Two six-carbon hydrocarbon compounds with screening values in Table 3 of USEPA (March 2018b), the aliphatic hexane and the aromatic benzene, were considered as potential surrogates for cyclohexane and methylcyclohexane. The lower of the ESVs for these two potential surrogate compounds, the ESV for hexane, was selected to provide a reasonably conservative surrogate for cyclohexane and methylcyclohexane.

4.2.2 Step 2: Exposure Estimation and Risk Calculation

The second step of the SLERA includes an estimation of the potential for exposure of ecological receptors to site-related contaminants, including description of the ecological setting and development of a preliminary ecological CSM. To ensure that possible contributors to risk are not overlooked, the preliminary COPEC screening (risk calculation) is based on consistently conservative assumptions regarding exposure, in accordance with USEPA guidance (USEPA, June 1997). For example, the concentrations used in screening are the maximum detected concentrations in a given medium, the receptors assumed to be exposed are organisms with the greatest potential for contact with the exposure medium, and the detected concentrations of chemicals are assumed to be completely bioavailable.

4.2.2.1 Ecological Setting

Community Description

The ecological community at OMS #28 consists of a forested area with a canopy of mainly oak trees as well as smaller trees, shrubs, grasses, and forbs in the understory. This undeveloped area is in the northern and western portion of the Site and is surrounded by a railway and highways to the north and west, residential parcels to the north and northeast, and the pavement and buildings of the OMS #28 area to the east and southeast. The diversity of vegetation and habitats in this terrestrial community is limited, and the community is fragmented and separated from other, larger habitat areas. As a result, this area likely provides habitat for a limited fauna of wildlife species that typically are common in close proximity to development and human activity. Mammals that may occur in this community include the gray squirrel, eastern cottontail, opossum, southern short-tailed shrew, and cotton mouse. Birds likely to utilize these habitats include the American robin, brown thrasher, mockingbird, cardinal, and Carolina wren. Reptiles that may be present include the gray rat snake, southern fence lizard, and green anole. Amphibians potentially occurring in this community include the gray frog and southern toad. There are no surface waters or aquatic communities in the vicinity of the Site.

Threatened and Endangered Species

Information on the potential for occurrence of federally listed endangered or threatened species in the vicinity of the Site, as well as other species that are proposed or candidates for federal listing, was requested online from the US Fish and Wildlife Service (USFWS) through the Information for Planning and Consultation (IPaC) project review system. The report provided a list of species under USFWS jurisdiction that are known or expected to occur in the region of the Site based on their ranges. Of the six species identified, two are terrestrial. Given the lack of aquatic habitats on or near the Site, only these terrestrial species potentially could occur at the Site: the eastern indigo snake (*Drymarchon corais couperi*) and the black pine snake (*Pituophis melanoleucus lodingi*), both of which have a federal listing status of threatened. Based on their habitat requirements, including the need for large tracts of undisturbed habitat, and the lack of sufficient suitable habitat on and near the Site, neither species is likely to occur at the Site. No known ecological survey has been conducted at the Brookley Aeroplex since the ecological reconnaissance conducted as part of the Former Brookley AFB RI activities in the early 2000s. No threatened or endangered species occurrences have been reported or confirmed on the property.

4.2.2.2 Ecological CSM

The ecological CSM for the site is illustrated in the EPD (**Figure 4**), which shows the potential contaminant migration and exposure pathways through which ecological receptors may be exposed to site-related contaminants. Only terrestrial ecological receptors are represented in the EPD because there are no water bodies supporting aquatic receptors (organisms that do not breathe air) on the Site or in the vicinity. Potentially complete pathways that would not result in significant exposure or warrant quantitative evaluation are identified in the diagram by an asterisk. Potentially complete exposure pathways that are considered potentially significant and to warrant evaluation in the ERA are identified in the diagram by an "X."

Terrestrial receptors potentially could be exposed to site-related contaminants in surface soil, principally through incidental ingestion while foraging or grooming. Although animal exposure pathways based on inhalation (of VOCs from soil) and dermal absorption (from skin contact with contaminated soil) may be considered potentially complete, these pathways usually are negligible contributors to chemical intakes compared to ingestion pathways and are difficult to quantify (USEPA, February 2005). Based on the soil sample intervals collected, surface soil was considered to include the interval from 0 to 1 foot bgs. Surface soil samples from wooded areas with ecological habitat were collected in Parcels A and F. Parcel E is covered by pavement and buildings and provides essentially no habitat for ecological receptors. Surface soil samples were not collected in Parcels B, C, D, G, or H.

Exposures to subsurface soil (1 to 6 feet bgs) as a result of burrowing in onsite areas with subsurface soil contamination may be a potentially complete pathway for a few small mammals in the wooded, northwest area of the Site. However, the potential for such exposures is minimal, and the likelihood that they could have significant ecological effects is sufficiently low that they were considered not to warrant evaluation.

Migration of contaminants from source media to exposure media at the site may involve transport mechanisms that include the uptake of chemicals from soil by plants and animals and transfer through the food chain. USEPA Region 4 does not identify the VOCs detected in soil as bioaccumulative compounds that warrant evaluation through food-chain modeling (USEPA, March 2018b). Based on the low bioaccumulation potential of the VOCs detected in soil and the small areal extent of elevated VOC concentrations in soil, food chain exposures were predicted not to be significant and were considered not to warrant quantitative evaluation.

4.2.2.3 Screening-Level Risk Calculation

A concentration less than or equal to a conservative screening level generally indicates that a chemical is unlikely to pose significant risk to ecological receptors in the area sampled and does not warrant further evaluation in the ERA. If the concentration is greater than the screening level, the chemical is identified initially as a preliminary COPEC in that medium. HQs are calculated by dividing the maximum detected concentration of a chemical by an ESV for that chemical and medium:

$$HQ = \text{Concentration} / \text{ESV}$$

A chemical with an HQ greater than or equal to 1 is identified as a preliminary COPEC. When the maximum detected concentration of each VOC detected in surface soil was divided by its soil ESV, only the HQ for PCE was greater than or equal to 1. Therefore, PCE was identified as a preliminary COPEC (**Table 20**).

The ESV used in the HQ calculation for PCE was based on an estimated effects level for soil invertebrates derived by USEPA Region 4 using a water quality benchmark and an equilibrium-partitioning model.

4.2.3 Scientific/Management Decision Point 1

Scientific/Management Decision Point 1 follows the completion of Steps 1 and 2 of the SLERA and determines whether there is justification to continue to the next step of the ERA process. The results of the SLERA are evaluated at this point to determine whether site-related chemicals pose negligible ecological risk (thereby providing a basis for recommending no further action with regard to ecological risk at the site) or have the potential to pose significant ecological risk (thereby providing a basis for recommending continuation of the ERA). The evaluation identified high concentrations of PCE in a small area of surface soil that may pose risk to ecological receptors. Therefore, further evaluation of ecological risk in a Baseline ERA was warranted.

4.3 BASELINE ERA – PROBLEM FORMULATION (STEP 3)

Step 3, Problem Formulation, typically establishes the goals, breadth, and focus of a Baseline ERA. The majority of Step 3 is the refinement of preliminary COPECs in a Concentration-Based Refinement Screening and a Dose-Based Refinement Screening. The remaining sections of Problem Formulation are a discussion of uncertainty and a characterization of risk.

4.3.1 Ecological Endpoints

The assessment endpoints representing the values to be protected at the site and identified for evaluation in this ERA are the sustainability of wildlife populations (birds and mammals) that may utilize the terrestrial habitats at the site. In order to evaluate effects on assessment endpoints, representative receptors (also referred to as endpoint species) are selected. Receptors are selected to represent assessment endpoints based principally on factors such as the presence of the receptor at the site and its importance in the community food web; the susceptibility of the receptor to the contaminants at the site, including potential for exposure directly and through bioaccumulation and biomagnification in food chains; and the availability of data describing the receptor's potential for exposure and toxicological effects that may result from exposure. The representative receptor identified for evaluation was the southern short-tailed shrew. It is a small, invertivorous mammal with a small home range that provides a conservative evaluation of potential wildlife exposures to soil contaminants in localized areas. It has a relatively high potential for indirect exposures to bioaccumulative contaminants through the ingestion of soil invertebrates and for direct exposures to contaminants in soil due to its burrowing and feeding habits. Given its characteristics, the shrew is expected to have a higher potential for exposure to PCE in soil at the site than other wildlife receptors.

4.3.2 Concentration-Based Refinement Screening

A concentration-based refinement screening was performed due to the identification of PCE as a preliminary COPEC in surface soil, This refinement screening calculated an HQ using the maximum detected concentration and a soil refinement screening value (RSV) that is a soil concentration protective of small mammals, which are receptors of potential concern at the Site (**Table 21**). An RSV for PCE was not available for birds. Only the maximum detected concentration of PCE was used in the screening because the 95 percent UCL concentration was higher than the maximum. Five sample locations (OMS-

28-SB24, OMS-28-SB28, OMS-28-SB29, OMS-28-SB30, and OMS-28-SB31) within an area of approximately 1,600 square feet (0.037 acre) in Parcel A substantially exceeded the mammalian RSV (HQs based on these samples ranged from 1,828 to 32). The other four detections of PCE in surface soil (OMS-28-25 and OMS-28-27 at Parcel A and OMS-28-18 and OMS-28-19 at Parcel F) were less than the mammalian RSV.

4.3.3 Dose-Based Refinement

The dose-based refinement further evaluates the potential for risk from PCE, which was identified as a refined COPEC in soil based on screening against an RSV protective of mammals. The dose-based refinement is based on measured contaminant levels in soil, modeled contaminant levels in the food chain, and calculated exposure doses that are compared to toxicity reference values (TRVs) for the protection of mammalian wildlife. The receptor evaluated in the dose-based refinement was a shrew, which represents wildlife that could occur at the site and would have a maximal potential for exposure to soil contaminants. Evaluation of risk to this species provides a conservative indication of potential risk to the wildlife assessment endpoint. The dose-based refinement includes the following components: Exposure Assessment, Effects Assessment, and Identification of Final COPECs for the assessment endpoint.

4.3.3.1 Exposure Assessment

Exposure pathway analysis is the initial step in exposure assessment for the dose-based refinement. The calculation of exposures is shown in **Table 22** for the shrew. This analysis is performed based on the CSM for the Site, which includes potentially complete food-chain exposure pathways. Exposure pathways for terrestrial receptors at the Site include the ingestion of contaminants through the food chain and through the incidental ingestion of soil (via feeding, grooming, and/or burrowing).

The exposures experienced by higher-taxonomic-level receptors exposed through ingestion (i.e., mammals) were estimated based on the maximum detected concentration. The 95% UCL concentration would have been included as a focus of the exposure assessment; however, the 95% UCL was higher than the maximum detected concentration and, therefore, was not used. The daily exposure dose of PCE potentially received by the receptor (shrew) was calculated in order to allow comparison to a TRV that is also expressed as a daily exposure dose. Analytical models can be used to calculate the exposure dose by estimating concentrations in the food chain using literature-derived bioaccumulation factors (BAFs). The following example illustrates the calculation of exposure dose based on a shrew as the receptor.

Exposure dose to shrew = (intake from invertebrates + intake from incidental soil ingestion) x area foraging factor / body weight

The equation for this calculation is:

$$ED_{shrew} = [(C_{soil} \times BAF_{inv} \times IR_{inv}) + (C_{soil} \times IR_{soil})] \times AFF/BW$$

where:

ED_{shrew} = exposure dose to shrew (milligrams per kilogram [mg/kg] BW/day)

C_{soil} = concentration in soil (mg/kg dry weight)

BAF_{inv} = bioaccumulation factor from soil to soil-dwelling invertebrates (unitless)

IR_{inv} = ingestion rate of invertebrates by the shrew (kilograms per day [kg/day] dry weight)

IR_{soil} = ingestion rate of soil by the shrew (kg/day dry weight)

AFF = area foraging factor for the shrew (unitless) = exposure area/shrew home range

BW = body weight (kg wet weight)

To evaluate exposures resulting from the transfer of contaminants through the food chain, BAFs were used to quantify bioaccumulation from soil for soil-dwelling invertebrates (i.e., earthworms). The BAFs used in the ERA and the sources of these transfer factors are presented in **Table 23**. The exposure factors used in the dose-based refinement to estimate exposure dose for the shrew, including BW, dietary composition, ingestion rate, and home range, and the basis for the values used, are provided in **Table 24**. Values for receptor-specific exposure factors such as dietary composition, BW, and feeding rate principally were based on USEPA's *Wildlife Exposure Factors Handbook* (USEPA, December 1993) and preferred values from USEPA Region 4 (USEPA, June 2019).

The area foraging factor (AFF) in the equation adjusts the exposure dose based on the degree to which areas of contamination and receptor habitat may overlap. An AFF is used to modify estimated exposures based on the expected use of a contaminated area by a receptor. This factor is calculated by dividing the exposure area by the receptor's home range or foraging area. The AFF cannot exceed a value of 1; therefore, if the exposure area is larger than the receptor's home range, the AFF will equal 1 and will not reduce the calculated exposure. The soil exposure area for PCE was estimated to include approximately 0.037 acre within Parcel A. The home range of the shrew is approximately 1 acre, so the AFF was 0.037 (0.037 acre/1 acre).

4.3.3.2 Effects Assessment

Assessment of the potential for the refined COPEC in soil (PCE) to cause adverse effects in upper-trophic-level receptors requires the derivation of conservative and alternative TRVs. The conservative and alternative TRVs for evaluating exposures of receptors to contaminants via direct ingestion as well as the food chain were based on TRVs obtained from the literature. TRVs are expressed as the amount of contaminant ingested per unit BW (wet-weight basis) per day. Conservative TRVs are based on a no-observed-adverse-effect-level (NOAEL) for long-term (chronic) exposures, while alternative TRVs are based on a lowest-observed-adverse-effect-level (LOAEL) for chronic exposures. Ecological effects of most concern are those that can impact populations or higher levels of ecological organization, such as effects on reproduction, growth/development, and survival (USEPA, June 1997). Therefore, NOAELs and LOAELs from studies in which these effects were the study endpoints were preferred.

The basis for each TRV is documented in **Table 25**. Avian TRVs were not available from PCE. Preferred sources of mammalian TRVs were the chemical-specific Eco-SSL derivation documents (USEPA, 2003−2008). However, Eco-SSLs were not derived by USEPA for PCE. Therefore, TRVs were identified from another source as described in the table.

4.3.3.3 Identification of Dose-Based Final COPECs

In the dose-based refinement, food-chain modeling was used to estimate a maximum exposure dose based on the maximum detected concentration of PCE in surface soil. The dose was compared to both conservative (NOAEL-based) and alternative (LOAEL-based) TRVs to calculate a pair of HQs for a maximally exposed mammalian receptor, a shrew. The pair of HQs (conservative HQ = 24, alternative HQ = 4.7) provides a conservative indication of the range of potential risks posed to a shrew.

4.3.4 Ecological Risk Characterization

The mammalian RSV (0.18 mg/kg in soil) provided by USEPA Region 4 was from the Los Alamos National Laboratory (LANL) ECORISK database. It was based on a NOAEL for a montane shrew (insectivore) and was the lowest of the NOAEL-based ecological screening levels (ESLs) derived by LANL for a range of representative wildlife. ESLs based on LOAELs were also derived for each of the LANL representative species. The LOAEL-based ESL for the montane shrew was 0.94 mg/kg. The other mammals for which LANL calculated ESLs (NOAEL-based and LOAEL-based) included an omnivore, the deer mouse (0.35 mg/kg, 1.7 mg/kg); an herbivore, the mountain cottontail (9.5 mg/kg, 47 mg/kg); and a carnivore, the gray fox (120 mg/kg, 630 mg/kg), The maximum detected concentration of PCE (329 mg/kg) at the Site exceeds all of these ESLs except the LOAEL-based ESL for the gray fox.

Comparison to these screening levels in conjunction with the magnitude of the HQ from the risk calculation in **Table 26** indicate a discrete hot spot of contamination in surface soil within the wooded area near the northwest perimeter of OMS #28. The areal extent of the elevated concentrations (0.037 acre) is substantially smaller than the home range of even the smallest and most exposed receptor, a shrew, which typically has a home range of approximately 1 acre. Other receptors would typically have larger home ranges and lower potential exposures. However, an individual receptor with a very small home range that encompassed the hot spot area, such as a shrew or a mouse, potentially could be sufficiently exposed to PCE in soil within the hot spot area to be adversely affected.

The results of the risk calculation and other lines of evidence indicate that the potential for exposure and risk to ecological receptors is minimal. PCE in surface soil, the only COPEC identified at the Site, warrants identification as a final COPEC due to its high concentrations within a small area of surface soil. However, the potential for significant exposures of multiple individual receptors is very small, and even if an individual receptor was affected, the population in the vicinity of OMS #28 would not be noticeably affected. Given the predicted lack of observable effects on populations, the risk would not be ecologically significant.

4.3.5 Uncertainty

Uncertainty is inherent in the risk assessment process. The principal activities performed in an ERA can be grouped into three components: exposure assessment, effects assessment, and risk characterization. The uncertainties associated with these components of this ERA are discussed below.

4.3.5.1 Exposure Assessment Uncertainty

Among the sources of uncertainty in exposure assessment is the detection of chemicals and their concentrations in environmental media. The initial screening tables of the ERA included all chemicals analyzed in each exposure medium. Those analytes not detected in any sample in a particular medium or exposure group are very unlikely to be present at concentrations that could adversely affect ecological receptors. There is the possibility that a chemical not detected may be present at levels below its detection limit. This is a concern only if the detection limit is higher than the level at which the chemical causes toxicity, which potentially could result in the underestimation of risk from that chemical.

The laboratory methods used in analyzing the samples provide essentially the lowest method detection limits (MDLs), sample quantitation limits (SQLs), and RLs practicable. SQLs and reps generally are 5 to 10 times the MDL and can be elevated to much higher levels for individual samples due to matrix-dependent characteristics such as dilution and moisture content. If a chemical is present at a level below the SQL or RL but above the MDL, its concentration is reported as an estimated value (J-flagged), and the chemical is evaluated in the ERA using the estimated concentration. Thus, there is the potential for increased uncertainty in the ERA only if the concentration of the chemical and its ESV are less than the MDL. Given that such a chemical would be present at consistently low concentrations (never above the detection limit in any sample), its contribution to the total risk posed by detected chemicals is expected to be negligible, and the presence of non-detected chemicals has only a minimal potential to increase uncertainty associated with the assessment of exposure and risk for the site.

Uncertainty in exposure assessment is minimized by making conservative assumptions throughout the process. The receptors selected for evaluation as representatives of the assessment endpoints are considered to provide a conservative representation of the range of exposures that may be experienced by other species not evaluated. In estimating many receptor exposure factors (e.g., dietary composition, food IRs, and home range), conservative values are assumed. For example, a shrew was assumed to live entirely on a home range containing the contaminated soil exposure areas and to consume a diet composed entirely of earthworms living in contaminated soil. Furthermore, exposure was calculated based on both the maximum detected concentration and the 95% UCL of the mean concentration (if calculable and less than the maximum), and it was conservatively assumed that the entire concentration of each contaminant is in a form that is 100% bioavailable and taken up by an exposed receptor. The conservative exposure factors and the range of exposure concentrations together provide confidence that the calculated exposures are at the conservative end of the range of exposures that may be experienced by receptor populations.

Estimation of contaminant intakes based on food-chain modeling is inherently uncertain because of the many factors in the model for which measured, site-specific data are not available. Bioaccumulation factors from soil to invertebrates are conservatively based on earthworm data, even though earthworms make up only a portion of the invertebrates ingested by a shrew or other receptors. Bioaccumulation factors based on earthworms are expected to overestimate the accumulation of chemicals in other invertebrates (e.g., insects and arachnids) that are more mobile, protected by exoskeletons, and have less direct contact with soil.

Intakes from dermal and inhalation exposures are not quantifiable for ecological receptors. However, this does not significantly increase the uncertainty of the estimated total intake because, for most receptors, intakes via these routes are minimal relative to intakes via ingestion.

4.3.5.2 Toxicity Assessment Uncertainty

Uncertainty in toxicity assessment may result from many sources. There is a moderate level of uncertainty associated with screening against ESVs, RSVs, and TRVs from the literature. There is uncertainty associated with the performance of the toxicity tests on which ESVs, RSVs, and TRVs are based and with the relevance of specific toxicity values to native organisms at the site.

Conformance by laboratories with standard methods and quality control procedures reduces uncertainty in the accuracy of test results, and ESVs, RSVs, and TRVs were derived to be conservative values that are intended to be protective of sensitive receptors. Toxicity to wildlife was evaluated based on both conservative (e.g., NOAEL-based) and alternative (e.g., LOAEL-based) TRVs, in conjunction with the maximum detected concentration and, if calculable and less than the maximum, the 95% UCL concentration. The range of HQs calculated based on this range of ESVs, RSVs, and TRVs increases confidence that any potential risks of adverse ecological effects to the assessment endpoints are not underestimated.

The lack of ESVs and TRVs specific to certain chemicals and the resultant use of surrogate values introduce uncertainty into the toxicity assessment for these chemicals. Surrogate values were selected based on structural and functional similarities and conservative toxicity values. Qualitative lines of evidence (e.g., frequency of detections, magnitude of detections, and consideration of risk estimates for receptors with toxicity values available) are used when toxicity values are lacking and surrogate values are also unavailable.

4.3.5.3 Risk Characterization Uncertainty

Uncertainty in risk characterization is affected by the methodologies employed in the preceding sections of the ERA. The reasonably conservative assumptions made and the procedures followed were intended to provide conservatism in the evaluation sufficient to minimize the possibility of underestimating risk while not significantly overestimating risk.

4.4 SCIENTIFIC/MANAGEMENT DECISION POINT 2

At SMDP 2, the results of Step 3 of the Baseline ERA Problem Formulation are considered by the risk managers to determine whether they concur with the assessment endpoints, representative receptors, and exposure pathways evaluated and with the risk assessment results (USEPA, June 1997). As summarized in Section 4.3.4, Step 3 of the ERA process identified one final COPEC (PCE) in surface soil of Parcel A of the Site. The assessment endpoint potentially at risk of impacts from this final COPEC are the sustainability of populations of native wildlife that utilize terrestrial habitats in a small (0.037 acre) area of Parcel A (representative receptor: the southern short-tailed shrew). Based on the results of the ERA, remedial action would not be warranted because the risks posed by PCE in surface soil within Parcel A were not found to be ecologically significant.

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TABLES

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel [(1)]	Sample ID [(1)]	Date Collected	Depth [(2)] (feet bgs)	VOCs (8260)	VOCs [(3)] (8260)	VOCs [(4)] (8260)
Soil						
A	OMS-28-SB24-1	05/10/17	0.5 - 1	X		
A	OMS-28-SB24-3	05/10/17	2.5 - 3	X		
A	OMS-28-SB24-5	05/10/17	4.5 - 5	X		
A	OMS-28-SB25-1	05/12/17	0.5 - 1			X
A	OMS-28-SB25-3	05/12/17	2.5 - 3			X
A	OMS-28-SB25-5	05/12/17	4.5 - 5			X
A	OMS-28-SB26-1	05/12/17	0.5 - 1			X
A	OMS-28-SB26-3	05/12/17	2.5 - 3			X
A	OMS-28-SB26-5	05/12/17	4.5 - 5			X
A	OMS-28-SB27-1	05/12/17	0.5 - 1			X
A	OMS-28-SB27-3	05/12/17	2.5 - 3			X
A	OMS-28-SB27-5	05/12/17	4.5 - 5			X
A	OMS-28-SB28-1	05/16/17	0.5 - 1			X
A	OMS-28-SB28-3	05/16/17	2.5 - 3			X
A	OMS-28-SB28-5	05/16/17	4.5 - 5			X
A	OMS-28-SB29-1	05/16/17	0.5 - 1			X
A	OMS-28-SB29-3	05/16/17	2.5 - 3			X
A	OMS-28-SB29-5	05/16/17	4.5 - 5			X
A	OMS-28-SB30-1	05/16/17	0.5 - 1			X
A	OMS-28-SB30-3	05/16/17	2.5 - 3			X
A	OMS-28-SB30-5	05/16/17	4.5 - 5			X
A	OMS-28-SB31-1	05/16/17	0.5 - 1			X
A	OMS-28-SB31-3	05/16/17	2.5 - 3			X
A	OMS-28-SB31-5	05/16/17	4.5 - 5			X
E	OMS-28-SB02-1	05/08/17	0.5 - 1			X
E	OMS-28-SB02-3	05/08/17	2.5 - 3			X
E	OMS-28-SB02-5	05/08/17	4.5 - 5			X
E	OMS-28-SB03-1	05/08/17	0.5 - 1			X
E	OMS-28-SB03-3	05/08/17	2.5 - 3			X
E	OMS-28-SB03-5	05/08/17	4.5 - 5			X
E	OMS-28-SB04-1	05/08/17	0.5 - 1	X		
E	OMS-28-SB04-2	05/08/17	1.5 - 2			X
E	OMS-28-SB04-5	05/08/17	4.5 - 5			X
E	OMS-28-SB05-1	05/08/17	0.5 - 1			X
E	OMS-28-SB05-2	05/08/17	1.5 - 2			X
E	OMS-28-SB05-5	05/08/17	4.5 - 5			X
E	OMS-28-SB06-1	05/08/17	0.5 - 1			X
E	OMS-28-SB06-3	05/08/17	2.5 - 3			X
E	OMS-28-SB06-6	05/08/17	5.5 - 6			X
E	OMS-28-SB07-1	05/08/17	0.5 - 1			X
E	OMS-28-SB07-3	05/08/17	2.5 - 3			X
E	OMS-28-SB07-6	05/08/17	5.5 - 6			X
E	OMS-28-SB08-1	05/08/17	0.5 - 1			X
E	OMS-28-SB08-3	05/08/17	2.5 - 3			X
E	OMS-28-SB08-6	05/08/17	5.5 - 6			X
E	OMS-28-SB09-1	05/08/17	0.5 - 1			X
E	OMS-28-SB09-2	05/08/17	1.5 - 2			X
E	OMS-28-SB09-3	05/08/17	2.5 - 3			X

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel (1)	Sample ID (1)	Date Collected	Depth (2) (feet bgs)	VOCs (8260)	VOCs (3) (8260)	VOCs (4) (8260)
Soil (Continued)						
E	OMS-28-SB11-1	05/08/17	0.5 - 1			X
E	OMS-28-SB11-4	05/08/17	3.5 - 4			X
E	OMS-28-SB11-6	05/08/17	5.5 - 6	X		
F	OMS-28-SB01-1	05/08/17	0.5 - 1			X
F	OMS-28-SB01-2	05/08/17	1.5 - 2	X		
F	OMS-28-SB01-3	05/08/17	2.5 - 3			X
F	OMS-28-SB10-1	05/08/17	0.5 - 1			X
F	OMS-28-SB10-2	05/08/17	1.5 - 2			X
F	OMS-28-SB10-3	05/08/17	2.5 - 3			X
F	OMS-28-SB12-1	05/08/17	0.5 - 1			X
F	OMS-28-SB12-3	05/08/17	2.5 - 3			X
F	OMS-28-SB12-6	05/08/17	5.5 - 6			X
F	OMS-28-SB13-1	05/08/17	0.5 - 1			X
F	OMS-28-SB13-3	05/08/17	2.5 - 3			X
F	OMS-28-SB13-5	05/08/17	4.5 - 5			X
F	OMS-28-SB14-1	05/08/17	0.5 - 1	X		
F	OMS-28-SB14-3	05/08/17	2.5 - 3			X
F	OMS-28-SB14-5	05/08/17	4.5 - 5			X
F	OMS-28-SB15-1	05/08/17	0.5 - 1			X
F	OMS-28-SB15-3	05/08/17	2.5 - 3			X
F	OMS-28-SB15-5	05/08/17	4.5 - 5			X
F	OMS-28-SB16-1	05/10/17	0.5 - 1			X
F	OMS-28-SB16-2.5	05/10/17	2 - 2.5			X
F	OMS-28-SB16-5	05/10/17	3.5 - 4	X		
F	OMS-28-SB17-1	05/10/17	0.5 - 1			X
F	OMS-28-SB17-2.5	05/10/17	2 - 2.5			X
F	OMS-28-SB17-5	05/10/17	4.5 - 5			X
F	OMS-28-SB18-1	05/10/17	0.5 - 1			X
F	OMS-28-SB18-2.5	05/10/17	2 - 2.5			X
F	OMS-28-SB18-5	05/10/17	4.5 - 5			X
F	OMS-28-SB19-1	05/10/17	0.5 - 1			X
F	OMS-28-SB19-2.5	05/10/17	2 - 2.5			X
F	OMS-28-SB19-5	05/10/17	4.5 - 5			X
F	OMS-28-SB20-1	05/10/17	0.5 - 1			X
F	OMS-28-SB20-1.5	05/10/17	1 - 1.5			X
F	OMS-28-SB20-2	05/10/17	1.5 - 2			X
F	OMS-28-SB21-1	05/10/17	0.5 - 1			X
F	OMS-28-SB21-1.5	05/10/17	1 - 1.5			X
F	OMS-28-SB21-2	05/10/17	1.5 - 2			X
F	OMS-28-SB22-1	05/10/17	0.5 - 1			X
F	OMS-28-SB22-1.5	05/10/17	1.5 - 2	X		
F	OMS-28-SB22-2	05/10/17	1.5 - 2			X
F	OMS-28-SB23-1	05/10/17	0.5 - 1			X
F	OMS-28-SB23-1.5	05/10/17	1 - 1.5			X
F	OMS-28-SB23-2	05/10/17	1.5 - 2			X

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel [1]	Sample ID [1]	Date Collected	Depth [2] (feet bgs)	VOCs (8260)	VOCs [3] (8260)	VOCs [4] (8260)
Groundwater						
A	OMS-28-GW19-12	05/09/17	8 - 12			X
A	OMS-28-GW19-19	05/09/17	15 - 19			X
A	OMS-28-GW19-30	05/09/17	26 - 30			X
A	OMS-28-GW22-11	05/09/17	7 - 11			X
A	OMS-28-GW22-20	05/09/17	16 - 20			X
A	OMS-28-GW22-28	05/09/17	24 - 28			X
A	OMS-28-GW23-12	05/10/17	8 - 12	X		X [5]
A	OMS-28-GW23-20	05/10/17	16 - 20			X
A	OMS-28-GW23-28	05/10/17	24 - 28			X
A	OMS-28-GW24-12	05/12/17	8 - 12			X
A	OMS-28-GW24-19	05/09/17	15 - 19			X
A	OMS-28-GW24-30	05/09/17	26 - 30			X
A	OMS-28-GW25-12	05/16/17	8 - 12			X
A	OMS-28-GW25-19	05/09/17	15 - 19			X
A	OMS-28-GW25-28	05/09/17	24 - 28			X
A	OMS-28-GW39-13	05/10/17	9 - 13			X
A	OMS-28-GW39-20	05/10/17	16 - 20			X
A	OMS-28-GW39-28	05/10/17	24 - 28			X
A	OMS-28-GW40-13	05/11/17	9 - 13			X
A	OMS-28-GW40-20	05/11/17	16 - 20			X
A	OMS-28-GW40-28	05/11/17	24 - 28			X
A	OMS-28-GW41-12	05/11/17	8 - 12			X
A	OMS-28-GW41-20	05/11/17	16 - 20	X		X [5]
A	OMS-28-GW41-28	05/11/17	24 - 28			X
B	OMS-28-GW42-12	05/10/17	8 - 12			X
B	OMS-28-GW42-20	05/10/17	16 - 20			X
B	OMS-28-GW42-28	05/10/17	24 - 28			X
B	OMS-28-GW43-12	05/12/17	8 - 12			X
B	OMS-28-GW43-20	05/12/17	16 - 20			X
B	OMS-28-GW43-28	05/12/17	24 - 28			X
B	OMS-28-GW45-18	05/12/17	14 - 18			X
B	OMS-28-GW45-32	05/12/17	28 - 32			X
B	OMS-28-GW57-12	05/17/17	8 - 12			X
B	OMS-28-GW57-16	05/12/17	12 - 16	X		X [5]
B	OMS-28-GW57-33	05/12/17	29 - 33			X
C	OMS-28-2_050517 *	05/05/17	10 - 20	X		
C	OMS-28-2-011916 *	01/19/16	10 - 20	X		
C	OMS-28-GW44-28	05/16/17	24 - 28			X
C	OMS-28-GW60-16	05/16/17	12 - 16			X
C	OMS-28-GW60-33	05/16/17	29 - 33			X
D	OMS-28-GW46-16	05/12/17	12 - 16			X
D	OMS-28-GW46-33	05/12/17	29 - 33			X
D	OMS-28-GW64-16	05/17/17	12 - 16			X
D	OMS-28-GW64-33	05/17/17	29 - 33			X
D	OMS-28-GW72-33	05/19/17	29 - 33			X
D	OMS-28-GW73-16	01/29/18	12 - 16		X	
D	OMS-28-GW73-33	01/29/18	29 - 33		X	

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel (1)	Sample ID (1)	Date Collected	Depth (2) (feet bgs)	VOCs (8260)	VOCs (3) (8260)	VOCs (4) (8260)
Groundwater (Continued)						
D	OMS-28-GW74-15	01/30/18	11 - 15		X	
D	OMS-28-GW74-33	01/30/18	29 - 33		X	
D	OMS-28-GW75-29	01/30/18	25 - 29		X	
D	OMS-28-GW90-33	02/05/18	29 - 33		X	
D	OMS-28-GW91-33	02/06/18	29 - 33		X	
D	OMS-28-GW92-12	02/06/18	8 - 12		X	
D	OMS-28-GW92-16	02/06/18	12 - 16		X	
D	OMS-28-GW92-33	02/06/18	29 - 33		X	
D	OMS-28-GW93-12	02/06/18	8 - 12		X	
D	OMS-28-GW93-16	02/06/18	12 - 16		X	
D	OMS-28-GW93-33	02/06/18	29 - 33		X	
E	MW-5_050517 *	05/01/17	3.3 - 13.3	X		
E	MW-5-012016 *	01/20/16	3.3 - 13.3	X		
E	MW-6_050517 *	05/01/17	2.3 - 12.3	X		
E	MW-6-012016 *	01/20/16	2.3 - 12.3	X		
E	MW-8_050517 *	05/01/17	4.8 - 14.8	X		
E	MW-8-012216 *	01/22/16	4.8 - 14.8	X		
E	OMS-28-7_050517 *	05/01/17	10 - 20	X		
E	OMS-28-7-012016 *	01/20/16	10 - 20	X		
E	OMS-28-GW01-10	05/02/17	6 - 10			X
E	OMS-28-GW01-19	05/02/17	15 - 19			X
E	OMS-28-GW01-32	05/02/17	28 - 32			X
E	OMS-28-GW05-11	05/02/17	7 - 11			X
E	OMS-28-GW05-19	05/02/17	15 - 19			X
E	OMS-28-GW05-33	05/02/17	29 - 33			X
E	OMS-28-GW30-11	05/04/17	6 - 11			X
E	OMS-28-GW30-20	05/04/17	16 - 20			X
E	OMS-28-GW30-33	05/04/17	29 - 33			X
E	OMS-28-GW31-12	05/02/17	8 - 12			X
E	OMS-28-GW31-19	05/02/17	15 - 19			X
E	OMS-28-GW31-31	05/02/17	27 - 31			X
E	OMS-28-GW32-12	05/02/17	8 - 12	X		X (5)
E	OMS-28-GW32-19	05/02/17	15 - 19			X
E	OMS-28-GW32-31	05/02/17	27 - 31			X
E	OMS-28-GW33-12	05/02/17	8 - 12			X
E	OMS-28-GW33-19	05/02/17	15 - 19			X
E	OMS-28-GW33-33	05/02/17	29 - 33			X
E	OMS-28-GW52-19	05/15/17	15 - 19			X
E	OMS-28-GW52-31	05/13/17	27 - 31			X
E	OMS-28-GW53-12	05/13/17	8 - 12			X
E	OMS-28-GW53-19	05/13/17	15 - 19			X
E	OMS-28-GW53-31	05/13/17	27 - 31			X
E	OMS-28-GW56-18	05/15/17	14 - 18			X
E	OMS-28-GW56-31	05/15/17	27 - 31			X
E	OMS-28-GW58-12	05/15/17	8 - 12			X
E	OMS-28-GW58-19	05/15/17	15 - 19			X
E	OMS-28-GW58-31	05/15/17	27 - 31	X		X (5)

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel [1]	Sample ID [1]	Date Collected	Depth [2] (feet bgs)	VOCs (8260)	VOCs [3] (8260)	VOCs [4] (8260)
Groundwater (Continued)						
E	OMS-28-GW62-12	05/16/17	8 - 12			X
E	OMS-28-GW62-19	05/16/17	15 - 19	X		X [5]
E	OMS-28-GW62-30	05/16/17	26 - 30			X
E	OMS-28-GW66-26	05/18/17	22 - 26			X
E	OMS-28-GW66-49	05/18/17	45 - 49			X
E	OMS-28-GW67-26	05/18/17	22 - 26			X
E	OMS-28-GW67-52	05/18/17	48 - 52			X
E	OMS-28-GW68-26	05/18/17	22 - 26			X
E	OMS-28-GW68-57	05/18/17	53 - 57			X
E	OMS-28-GW69-26	05/18/17	22 - 26			X
E	OMS-28-GW69-49	05/19/17	45 - 49			X
E	OMS-28-GW81-18	01/30/18	14 - 18		X	
E	OMS-28-GW81-28	01/31/18	24 - 28		X	
E	OMS-28-GW82-19	02/02/18	15 - 19		X	
E	OMS-28-GW82-31	02/02/18	27 - 31		X	
E	OMS-28-GW83-12	02/02/18	8 - 12		X	
E	OMS-28-GW83-16	02/02/18	12 - 16		X	
E	OMS-28-GW83-31	02/02/18	27 - 31		X	
E	OMS-28-GW84-12	02/05/18	8 - 12		X	
E	OMS-28-GW84-17	02/05/18	13 - 17		X	
E	OMS-28-GW84-31	02/05/18	27 - 31		X	
E	OMS-28-GW85-13	02/02/18	9 - 13		X	
E	OMS-28-GW85-19	02/02/18	15 - 19		X	
E	OMS-28-GW85-31	02/02/18	27 - 31		X	
E	OMS-28-GW86-12	02/03/18	8 - 12		X	
E	OMS-28-GW86-16	02/03/18	12 - 16		X	
E	OMS-28-GW86-31	02/03/18	27 - 31		X	
E	OMS-28-GW87-31	02/03/18	27 - 31		X	
E	OMS-28-GW88-12	02/05/18	8 - 12		X	
E	OMS-28-GW88-17	02/05/18	13 - 17		X	
E	OMS-28-GW88-31	02/05/18	27 - 31		X	
E	OMS-28-GW89-31	01/30/18	27 - 31		X	
F	MW-9_050517	05/05/17	7.4 - 17.4	X		
F	MW-9-012016	01/20/16	7.4 - 17.4	X		
F	OMS-28-3_050517 *	05/01/17	10 - 20	X		
F	OMS-28-3-012116 *	01/21/16	10 - 20	X		
F	OMS-28-4_050517 *	05/05/17	66 - 76	X		
F	OMS-28-4-012016 *	01/20/16	66 - 76	X		
F	OMS-28-5_050517 *	05/05/17	10 - 20	X		
F	OMS-28-5-012016 *	01/20/16	10 - 20	X		
F	OMS-28-GW02-12	05/03/17	8 - 12			X
F	OMS-28-GW02-19	05/03/17	15 - 19	X		X [5]
F	OMS-28-GW02-31	05/03/17	27 - 31			X
F	OMS-28-GW03-12	05/04/17	8 - 12			X
F	OMS-28-GW03-20	05/04/17	16 - 20			X
F	OMS-28-GW03-34	05/04/17	29 - 34	X		X [5]
F	OMS-28-GW04-10	05/03/17	6 - 10			X

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel [1]	Sample ID [1]	Date Collected	Depth [2] (feet bgs)	VOCs (8260)	VOCs [3] (8260)	VOCs [4] (8260)
Groundwater (Continued)						
F	OMS-28-GW04-17	05/03/17	13 - 17			X
F	OMS-28-GW04-31	05/03/17	27 - 31			X
F	OMS-28-GW06-11	05/17/17	7 - 11	X		X [5]
F	OMS-28-GW06-17	05/17/17	13 - 17			X
F	OMS-28-GW06-32	05/17/17	28 - 32			X
F	OMS-28-GW07-11	05/19/17	7 - 11			X
F	OMS-28-GW07-18	05/19/17	14 - 18			X
F	OMS-28-GW07-31	05/19/17	27 - 31			X
F	OMS-28-GW08-10	05/03/17	6 - 10			X
F	OMS-28-GW08-17	05/03/17	13 - 17			X
F	OMS-28-GW08-31	05/03/17	27 - 31			X
F	OMS-28-GW09-10	05/03/17	6 - 10			X
F	OMS-28-GW09-16	05/03/17	6 - 10			X
F	OMS-28-GW09-33	05/03/17	29 - 33			X
F	OMS-28-GW10-10	05/09/17	6 - 10			X
F	OMS-28-GW10-16	05/09/17	12 - 16			X
F	OMS-28-GW10-33	05/09/17	29 - 33			X
F	OMS-28-GW11-11	05/13/17	7 - 11	X		X [5]
F	OMS-28-GW11-19	05/13/17	15 - 19			X
F	OMS-28-GW11-30	05/13/17	26 - 30			X
F	OMS-28-GW12-12	05/19/17	8 - 12	X		X [5]
F	OMS-28-GW12-18	05/19/17	14 - 18			X
F	OMS-28-GW12-32	05/19/17	28 - 32			X
F	OMS-28-GW13-12	05/09/17	8 - 12			X
F	OMS-28-GW13-18	05/09/17	14 - 18			X
F	OMS-28-GW13-32	05/09/17	29 - 32	X		X [5]
F	OMS-28-GW14-11	05/13/17	7 - 11			X
F	OMS-28-GW14-20	05/13/17	16 - 20			X
F	OMS-28-GW14-30	05/13/17	26 - 30			X
F	OMS-28-GW15-12	05/05/17	8 - 12			X
F	OMS-28-GW15-19	05/05/17	15 - 19			X
F	OMS-28-GW15-30	05/05/17	26 - 30			X
F	OMS-28-GW16-12	05/04/17	8 - 12			X
F	OMS-28-GW16-19	05/04/17	15 - 19			X
F	OMS-28-GW16-30	05/04/17	26 - 30			X
F	OMS-28-GW17-12	05/04/17	8 - 12			X
F	OMS-28-GW17-19	05/04/17	15 - 19			X
F	OMS-28-GW17-28	05/04/17	24 - 28			X
F	OMS-28-GW18-12	05/05/17	8 - 12			X
F	OMS-28-GW18-18	05/05/17	14 - 18	X		X [5]
F	OMS-28-GW18-30	05/05/17	26 - 30			X
F	OMS-28-GW20-12	05/05/17	8 - 12	X		X [5]
F	OMS-28-GW20-19	05/04/17	15 - 19			X
F	OMS-28-GW20-28	05/04/17	24 - 28			X
F	OMS-28-GW21-12	05/05/17	8 - 12			X
F	OMS-28-GW21-18	05/05/17	14 - 18			X
F	OMS-28-GW21-30	05/05/17	26 - 30			X

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel (1)	Sample ID (1)	Date Collected	Depth (2) (feet bgs)	VOCs (8260)	VOCs (3) (8260)	VOCs (4) (8260)
Groundwater (Continued)						
F	OMS-28-GW26-31	05/09/17	27 - 31			X
F	OMS-28-GW34-19	05/17/17	15 - 19			X
F	OMS-28-GW34-31	05/17/17	27 - 31	X		X (5)
F	OMS-28-GW36-12	05/11/17	8 - 12			X
F	OMS-28-GW36-18	05/11/17	14 - 18			X
F	OMS-28-GW36-29	05/11/17	25 - 29			X
F	OMS-28-GW37-12	05/11/17	8 - 12			X
F	OMS-28-GW37-19	05/11/17	15 - 19			X
F	OMS-28-GW37-28	05/11/17	24 - 28			X
F	OMS-28-GW38-12	05/11/17	8 - 12			X
F	OMS-28-GW38-18	05/11/17	14 - 18			X
F	OMS-28-GW38-30	05/11/17	26 - 30	X		X (5)
F	OMS-28-GW47-19	05/17/17	15 - 19			X
F	OMS-28-GW47-32	05/17/17	28 - 32			X
F	OMS-28-GW49-12	05/15/17	8 - 12	X		X (5)
F	OMS-28-GW49-18	05/15/17	14 - 18			X
F	OMS-28-GW49-30	05/15/17	26 - 30			X
F	OMS-28-GW50-13	05/15/17	9 - 13			X
F	OMS-28-GW50-18	05/15/17	14 - 18			X
F	OMS-28-GW50-30	05/15/17	26 - 30			X
F	OMS-28-GW51-30	05/13/17	26 - 30			X
F	OMS-28-GW54-12	05/13/17	8 - 12			X
F	OMS-28-GW54-19	05/13/17	15 - 19			X
F	OMS-28-GW54-32	05/13/17	28 - 32			X
F	OMS-28-GW55-12	05/13/17	8 - 12			X
F	OMS-28-GW55-19	05/13/17	15 - 19			X
F	OMS-28-GW55-32	05/13/17	28 - 32			X
F	OMS-28-GW59-10	05/16/17	8 - 12			X
F	OMS-28-GW59-18	05/16/17	14 - 18			X
F	OMS-28-GW59-30	05/16/17	26 - 30			X
F	OMS-28-GW61-12	05/17/17	8 - 12			X
F	OMS-28-GW61-19	05/17/17	15 - 19			X
F	OMS-28-GW61-31	05/17/17	27 - 31			X
F	OMS-28-GW63-12	05/17/17	8 - 12			X
F	OMS-28-GW63-19	05/17/17	15 - 19			X
F	OMS-28-GW63-30	05/17/17	26 - 30			X
F	OMS-28-GW65-12	05/17/17	8 - 12			X
F	OMS-28-GW65-19	05/17/17	15 - 19			X
F	OMS-28-GW65-29	05/17/17	25 - 29			X
F	OMS-28-GW71-19	05/19/17	15 - 19			X
F	OMS-28-GW71-30	05/19/17	29 - 33			X
G	MW-12_050517 *	05/01/17	5.6 - 15.6	X		
G	MW-12-012116 *	01/21/16	5.6 - 15.6	X		
G	OMS-28-1_050517 *	05/01/17	70 - 80	X		
G	OMS-28-1-012116 *	01/21/16	70 - 80	X		
G	OMS-28-GW76-13	01/31/18	9 - 13		X	
G	OMS-28-GW76-20	01/31/18	16 - 20		X	

Table 1a
Summary of Sample Locations and Analyses
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel [1]	Sample ID [1]	Date Collected	Depth [2] (feet bgs)	VOCs (8260)	VOCs [3] (8260)	VOCs [4] (8260)
Groundwater (Continued)						
G	OMS-28-GW76-28	01/31/18	24 - 28		X	
G	OMS-28-GW77-12	02/01/18	8 - 12		X	
G	OMS-28-GW77-20	02/01/18	16 - 20		X	
G	OMS-28-GW77-27	02/02/18	23 - 27		X	
G	OMS-28-GW78-12	01/31/18	8 - 12		X	
G	OMS-28-GW78-20	01/31/18	16 - 20		X	
G	OMS-28-GW78-27	02/01/18	23 - 27		X	
G	OMS-28-GW79-11	02/01/18	7 - 11		X	
G	OMS-28-GW79-17	02/01/18	13 - 17		X	
G	OMS-28-GW79-27	02/01/18	23 - 27		X	
G	OMS-28-GW80-11	02/01/18	7 -11		X	
G	OMS-28-GW80-17	02/02/18	13 - 17		X	
G	OMS-28-GW80-27	02/02/18	23 - 27		X	

Notes:

(1) - See Figure 3 for locations of parcels and samples.
* - Indicates sample was collected from a monitoring well. Other samples were grab samples.
(2) - Surface soils were collected from 0.5 to 1 foot.
Subsurface soils were collected from 1 to 6 feet.
Groundwater depths shown are the screened interval.
(3) - Analyzed only for cis-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride by on-site mobile laboratory.
(4) - Analyzed only for tetrachloroethene and trichloroethene by on-site mobile laboratory.
(5) - Tetrachloroethene and trichloroethene data results from off-site fixed laboratory were used instead of on-site mobile laboratory results.

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel [(1)]
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID [(2)]	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene		Trichloroethene		Vinyl Chloride	Reason for Inclusion in Plume
Parcel A								
OMS-28-GW19-19	5/9/17	—		95.7		38.7	—	2nd highest TCE conc.
OMS-28-GW19-12	5/9/17	—		2.2		3.3	—	This deeper depth included
OMS-28-GW19-30	5/9/17	—	<	1	<	1	—	This deeper depth included
OMS-28-GW22-11	5/9/17	—		40,000	<	1	—	Highest PCE conc.
OMS-28-GW22-20	5/9/17	—		74.3		0.82	—	This deeper depth included
OMS-28-GW22-28	5/9/17	—		77		0.92	—	This deeper depth included
OMS-28-GW23-12	5/10/17	—		0.863		0.751	—	GW23 is within identified plume
OMS-28-GW23-20	5/10/17	—	<	1	<	1	—	GW23 is within identified plume
OMS-28-GW23-28	5/10/17	—	<	1	<	1	—	GW23 is within identified plume
OMS-28-GW24-19	5/9/17	—		100		35.9	—	3rd highest TCE conc.
OMS-28-GW24-12	5/12/17	—		38.1		13.5	—	This deeper depth included
OMS-28-GW24-30	5/9/17	—		1.2	<	1	—	This deeper depth included
OMS-28-GW25-12	5/16/17	—	<	1	<	1	—	Not considered within the core/center of the plume
OMS-28-GW25-19	5/9/17	—		1.4		0.8	—	Not considered within the core/center of the plume
OMS-28-GW25-28	5/9/17	—	<	1		0.89	—	Not considered within the core/center of the plume
OMS-28-GW39-13	5/10/17	—		1000		15	—	4th highest PCE conc.
OMS-28-GW39-20	5/10/17	—		120		5.9	—	This deeper depth included
OMS-28-GW39-28	5/10/17	—	<	1	<	1	—	This deeper depth included
OMS-28-GW40-13	5/11/17	—		1800		35	—	2nd highest PCE; 4th highest TCE conc.
OMS-28-GW40-20	5/11/17	—		1500		46	—	3rd highest PCE; highest TCE conc.
OMS-28-GW40-28	5/11/17	—	<	1	<	1	—	This deeper depth included
OMS-28-GW41-12	5/11/17	—		31.5		6.5	—	Not considered within the core/center of the plume
OMS-28-GW41-20	5/11/17	—	<	0.5	<	0.5	—	Not considered within the core/center of the plume
OMS-28-GW41-28	5/11/17	—	<	1	<	1	—	Not considered within the core/center of the plume
Parcel B								
OMS-28-GW42-12	5/10/17	—		—		1.7	—	Not considered within the core/center of the plume
OMS-28-GW42-20	5/10/17	—		—		1.8	—	Not considered within the core/center of the plume
OMS-28-GW42-28	5/10/17	—		—	<	1	—	Not considered within the core/center of the plume
OMS-28-GW43-28	5/12/17	—		—		10	—	Highest TCE conc.
OMS-28-GW43-12	5/12/17	—		—	<	1	—	This deeper depth included
OMS-28-GW43-20	5/12/17	—		—	<	1	—	This deeper depth included
OMS-28-GW45-18	5/12/17	—		—		1	—	Not considered within the core/center of the plume
OMS-28-GW45-32	5/12/17	—		—		0.62	—	Not considered within the core/center of the plume
OMS-28-GW57-12	5/17/17	—		—	<	1	—	Not considered within the core/center of the plume
OMS-28-GW57-16	5/12/17	—		—	<	0.5	—	Not considered within the core/center of the plume
OMS-28-GW57-33	5/12/17	—		—	<	1	—	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel [(1)]
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID [(2)]	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel C		—			—	
OMS-28-2-011916	1/19/16	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-2 050517	5/5/17	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW44-28	5/16/17	—	—	4.43	—	Highest TCE conc.
OMS-28-GW60-16	5/16/17	—	—	< 1	—	Not considered within the core/center of the plume
OMS-28-GW60-33	5/16/17	—	—	< 1	—	Not considered within the core/center of the plume
Parcel D						
OMS-28-GW46-16	5/12/17	—	—	8.1	—	3rd highest TCE conc.
OMS-28-GW46-33	5/12/17	—	—	1.3	—	This deeper depth included
OMS-28-GW64-33	5/17/17	—	—	27.1	—	Highest TCE conc.
OMS-28-GW64-16	5/17/17	—	—	< 1	—	This shallower depth included
OMS-28-GW72-33	5/19/17	—	—	< 1	—	Not considered within the core/center of the plume
OMS-28-GW73-16	1/29/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW73-33	1/29/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW74-15	1/30/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW74-33	1/30/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW75-29	1/30/18	—	—	9.02	—	2nd highest TCE conc.
OMS-28-GW90-33	2/5/18	—	—	1.28	—	Not considered within the core/center of the plume
OMS-28-GW91-33	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW92-12	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW92-16	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW92-33	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW93-12	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW93-16	2/6/18	—	—	< 0.5	—	Not considered within the core/center of the plume
OMS-28-GW93-33	2/6/18	—	—	0.584	—	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel (1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID (2)	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel E						
MW-5-012016	1/20/16	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
MW-5_050517	5/1/17	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
MW-6-012016	1/20/16	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
MW-6_050517	5/1/17	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
MW-8-012216	1/22/16	< 0.5	—	7.8	< 0.5	Not considered within the core/center of the plume
MW-8_050517	5/1/17	< 0.5	—	0.373	< 0.5	Not considered within the core/center of the plume
OMS-28-7-012016	1/20/16	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
OMS-28-7_050517	5/1/17	< 0.5	—	< 0.5	< 0.5	Not considered within the core/center of the plume
OMS-28-GW01-10	5/2/17	NA	—	82.16	NA	Not considered within the core/center of the plume
OMS-28-GW01-19	5/2/17	NA	—	38	NA	Not considered within the core/center of the plume
OMS-28-GW01-32	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW05-11	5/2/17	NA	—	16.1	NA	Not considered within the core/center of the plume
OMS-28-GW05-19	5/2/17	NA	—	3.14	NA	Not considered within the core/center of the plume
OMS-28-GW05-33	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW30-11	5/4/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW30-20	5/4/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW30-33	5/4/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW31-12	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW31-19	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW31-31	5/2/17	NA	—	13.35	NA	Not considered within the core/center of the plume
OMS-28-GW32-12	5/2/17	3.71	—	268	0.022	3rd highest cis-1,2-DCE and 2nd highest TCE conc.
OMS-28-GW32-19	5/2/17	NA	—	6.26	NA	This deeper depth included
OMS-28-GW32-31	5/2/17	NA	—	15.6	NA	This deeper depth included
OMS-28-GW33-12	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW33-19	5/2/17	NA	—	38.21	NA	Not considered within the core/center of the plume
OMS-28-GW33-33	5/2/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW52-19	5/15/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW52-31	5/13/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW53-12	5/13/17	NA	—	21.4	NA	Not considered within the core/center of the plume
OMS-28-GW53-19	5/13/17	NA	—	31.3	NA	Not considered within the core/center of the plume
OMS-28-GW53-31	5/13/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW56-18	5/15/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW56-31	5/15/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW58-12	5/15/17	NA	—	5.34	NA	Not considered within the core/center of the plume
OMS-28-GW58-19	5/15/17	NA	—	48.02	NA	Not considered within the core/center of the plume
OMS-28-GW58-31	5/15/17	< 0.5	—	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW62-12	5/16/17	NA	—	3.47	NA	Not considered within the core/center of the plume
OMS-28-GW62-19	5/16/17	3.41	—	45.1	0.008	Not considered within the core/center of the plume
OMS-28-GW62-30	5/16/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW66-26	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW66-49	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW67-26	5/18/17	NA	—	0.91	NA	Not considered within the core/center of the plume
OMS-28-GW67-52	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel [1]
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID [2]	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel E (Continued)						
OMS-28-GW68-26	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW68-57	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW69-26	5/18/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW69-49	5/19/17	NA	—	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW81-18	1/30/18	1.29	—	11.1	< 0.05	Not considered within the core/center of the plume
OMS-28-GW81-28	1/31/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW82-19	2/2/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW82-31	2/2/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW83-12	2/2/18	< 0.5	—	3.59	< 0.05	Not considered within the core/center of the plume
OMS-28-GW83-16	2/2/18	1.28	—	51.3	< 0.05	Not considered within the core/center of the plume
OMS-28-GW83-31	2/2/18	< 0.5	—	0.644	< 0.05	Not considered within the core/center of the plume
OMS-28-GW84-12	2/5/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW84-17	2/5/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW84-31	2/5/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW85-19	2/2/18	7.56	—	291	0.028	Highest cis-1,2-DCE and TCE conc.
OMS-28-GW85-13	2/2/18	0.521	—	17.1	< 0.05	This shallower depth included
OMS-28-GW85-31	2/2/18	< 0.5	—	< 0.5	< 0.05	This deeper depth included
OMS-28-GW86-16	2/3/18	4.34	—	131	0.034	2nd highest cis-1,2-DCE, 3rd highest TCE, highest VC conc.
OMS-28-GW86-12	2/3/18	2.9	—	42.4	< 0.05	This shallower depth included
OMS-28-GW86-31	2/3/18	< 0.5	—	< 0.5	< 0.05	This deeper depth included
OMS-28-GW87-31	2/3/18	< 0.5	—	< 0.5	< 0.05	GW87 is within identified plume
OMS-28-GW88-12	2/5/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW88-17	2/5/18	< 0.5	—	< 0.5	< 0.05	Not considered within the core/center of the plume
OMS-28-GW88-31	2/5/18	< 0.5	—	0.894	< 0.05	Not considered within the core/center of the plume
OMS-28-GW89-31	1/30/18	1.03	—	5.22	< 0.05	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel (1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID (2)	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel F						
MW-9-012016	1/20/16	< 0.5	< 0.5	< 0.5	< 0.5	Not considered within the core/center of the plume
MW-9_050517	5/5/17	< 0.5	< 0.5	< 0.5	< 0.5	Not considered within the core/center of the plume
OMS-28-3-012116	1/21/16	1.59	< 0.5	8.92	< 0.5	Not considered within the core/center of the plume
OMS-28-3_050517	5/1/17	1.26	< 0.5	9.6	< 0.5	Not considered within the core/center of the plume
OMS-28-4-012016	1/20/16	< 0.5	0.88	< 0.5	< 0.5	Not considered within the core/center of the plume
OMS-28-4_050517	5/5/17	< 0.5	< 0.5	< 0.5	< 0.5	Not considered within the core/center of the plume
OMS-28-5-012016	1/20/16	27.8	455	200	< 2.5	2nd highest cis-1,2-DCE and PCE concs.
OMS-28-5_050517	5/5/17	103	154	246	< 1	Highest cis-1,2-DCE conc.
OMS-28-GW02-12	5/3/17	NA	< 1	0.63	NA	Not considered within the core/center of the plume
OMS-28-GW02-19	5/3/17	< 0.5	< 0.5	< 0.5	0.011	Not considered within the core/center of the plume
OMS-28-GW02-31	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW03-12	5/4/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW03-20	5/4/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW03-34	5/4/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW04-10	5/3/17	NA	< 1	1.37	NA	Not considered within the core/center of the plume
OMS-28-GW04-17	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW04-31	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW06-11	5/17/17	< 0.5	< 0.5	1.07	< 0.015	Not considered within the core/center of the plume
OMS-28-GW06-17	5/17/17	NA	< 1	65.95	NA	Not considered within the core/center of the plume
OMS-28-GW06-32	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW07-11	5/19/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW07-18	5/19/17	NA	< 1	310	NA	Not considered within the core/center of the plume
OMS-28-GW07-31	5/19/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW08-10	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW08-17	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW08-31	5/3/17	NA	< 1	71.17	NA	Not considered within the core/center of the plume
OMS-28-GW09-10	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW09-16	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW09-33	5/3/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW10-10	5/9/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW10-16	5/9/17	NA	< 1	68.9	NA	Not considered within the core/center of the plume
OMS-28-GW10-33	5/9/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW11-11	5/13/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW11-19	5/13/17	NA	< 1	24.3	NA	Not considered within the core/center of the plume
OMS-28-GW11-30	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW12-12	5/19/17	< 0.5	< 0.5	< 0.5	NA	Not considered within the core/center of the plume
OMS-28-GW12-18	5/19/17	NA	< 1	23.67	NA	Not considered within the core/center of the plume
OMS-28-GW12-32	5/19/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW13-12	5/9/17	NA	< 1	1.5	NA	Not considered within the core/center of the plume
OMS-28-GW13-18	5/9/17	NA	< 1	37.2	NA	Not considered within the core/center of the plume
OMS-28-GW13-32	5/9/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW14-11	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW14-20	5/13/17	NA	< 1	3.6	NA	Not considered within the core/center of the plume
OMS-28-GW14-30	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel (1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID (2)	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel F (Continued)						
OMS-28-GW15-12	5/5/17	NA	< 1	2.77	NA	Not considered within the core/center of the plume
OMS-28-GW15-19	5/5/17	NA	< 1	7.11	NA	Not considered within the core/center of the plume
OMS-28-GW15-30	5/5/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW16-12	5/4/17	NA	< 1	0.52	NA	Not considered within the core/center of the plume
OMS-28-GW16-19	5/4/17	NA	< 1	5.95	NA	Not considered within the core/center of the plume
OMS-28-GW16-30	5/4/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW17-12	5/4/17	NA	< 1	1.59	NA	Not considered within the core/center of the plume
OMS-28-GW17-19	5/4/17	NA	< 1	6.7	NA	Not considered within the core/center of the plume
OMS-28-GW17-28	5/4/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW18-18	5/5/17	2.44	< 0.5	4.42	0.18	Highest VC and 3rd highest cis-1,2-DCE conc.
OMS-28-GW18-12	5/5/17	NA	< 1	1.55	NA	This deeper depth included
OMS-28-GW18-30	5/5/17	NA	< 1	< 1	NA	This deeper depth included
OMS-28-GW20-12	5/5/17	0.927	25.7	32.5	0.024	2nd highest VC conc.
OMS-28-GW20-19	5/4/17	NA	< 1	< 1	NA	This deeper depth included
OMS-28-GW20-28	5/4/17	NA	< 1	< 1	NA	This deeper depth included
OMS-28-GW21-12	5/5/17	NA	460	510	NA	Highest PCE and TCE conc.
OMS-28-GW21-18	5/5/17	NA	11.85	230	NA	This deeper depth included
OMS-28-GW21-30	5/5/17	NA	< 1	< 1	NA	This deeper depth included
OMS-28-GW26-31	5/9/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW34-19	5/17/17	NA	< 1	2.56	NA	Not considered within the core/center of the plume
OMS-28-GW34-31	5/17/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW36-12	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW36-18	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW36-29	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW37-12	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW37-19	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW37-28	5/11/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW38-12	5/11/17	NA	59.7	11.8	NA	Not considered within the core/center of the plume
OMS-28-GW38-18	5/11/17	NA	14.2	1.5	NA	Not considered within the core/center of the plume
OMS-28-GW38-30	5/11/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW47-19	5/17/17	NA	< 1	3.32	NA	Not considered within the core/center of the plume
OMS-28-GW47-32	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW49-12	5/15/17	< 0.5	< 0.5	< 0.5	< 0.015	Not considered within the core/center of the plume
OMS-28-GW49-18	5/15/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW49-30	5/15/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW50-13	5/15/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW50-18	5/15/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW50-30	5/15/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW51-30	5/13/17	NA	< 1	< 1	NA	GW51 is within identified plume
OMS-28-GW54-12	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW54-19	5/13/17	NA	< 1	7.5	NA	Not considered within the core/center of the plume
OMS-28-GW54-32	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume

Table 1b
Groundwater COPCs and Rationale for Including Samples in the Core of the VOC Plume for Each Parcel [(1)]
Alabama Army National Guard OMS #28
Mobile, Alabama

Sample ID [(2)]	Date Collected	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	Vinyl Chloride	Reason for Inclusion in Plume
Parcel F (Continued)						
OMS-28-GW55-12	5/13/17	NA	< 1	0.65	NA	Not considered within the core/center of the plume
OMS-28-GW55-19	5/13/17	NA	< 1	2.9	NA	Not considered within the core/center of the plume
OMS-28-GW55-32	5/13/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW59-10	5/16/17	NA	1.86	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW59-18	5/16/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW59-30	5/16/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW61-12	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW61-19	5/17/17	NA	< 1	2.01	NA	Not considered within the core/center of the plume
OMS-28-GW61-31	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW63-12	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW63-19	5/17/17	NA	< 1	2.41	NA	Not considered within the core/center of the plume
OMS-28-GW63-30	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW65-12	5/17/17	NA	37.71	5.49	NA	Not considered within the core/center of the plume
OMS-28-GW65-19	5/17/17	NA	30.75	2.02	NA	Not considered within the core/center of the plume
OMS-28-GW65-29	5/17/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume
OMS-28-GW71-19	5/19/17	NA	< 1	4.7	NA	Not considered within the core/center of the plume
OMS-28-GW71-30	5/19/17	NA	< 1	< 1	NA	Not considered within the core/center of the plume

Notes:
(1) USEPA "…generally recommends that monitoring wells within the core/center of the plume be used to calculate the GW EPC for each contaminant." (OSWER Directive 9283.1-42, February 2014)
(2) Groundwater locations identified as having elevated concentrations within the core/center of the parcel-specific VOC plumes are shown on Figure 5 and are discussed in Section 3.3 of the text.
All concentrations are in units of ug/L.
COPC - Chemical of potential concern
NA - Not analyzed
— - Chemical is not a COPC, so results are not shown

Table 2
Identification of COPCs in Surface Soil
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical (1)	Minimum Concentration (2)	Maximum Concentration (2)	Units	Sample Designation of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (3)	Screening Value (4)	Background Value (5)	COPC?	Rationale Code (6)
Parcel A											
Tetrachloroethene	**0.0012 J/J**	**329**	**mg/kg**	**OMS-28-SB24-1**	**7 / 8**	**0.0006 - 3.07**	**329**	**8.1**	**NSV**	**Yes**	**ASL**
Trichloroethene	0.0034 /J	0.014 /J	mg/kg	OMS-28-SB29-1	3 / 8	0.0006 - 1.54	0.014	0.41	NSV	No	BSL
Parcel E											
Acetone	0.0044 J/J	0.0044 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000395	0.0044	7000	NSV	No	BSL
Benzene	0.00050 J/J	0.00050 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000197	0.00050	1.2	NSV	No	BSL
Cyclohexane	0.00070 J/J	0.00070 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000197	0.00070	650	NSV	No	BSL
Methylcyclohexane	0.0014 J/J	0.0014 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000197	0.0014	650	NSV	No	BSL
Methylene chloride	0.0031 J/J	0.0031 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.00079	0.0031	35	NSV	No	BSL
Toluene	0.0014 J/J	0.0014 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000197	0.0014	490	NSV	No	BSL
Xylenes (total)	0.00086 J/J	0.00086 J/J	mg/kg	OMS-28-SB04-1	1 / 1	0.000395	0.00086	58	NSV	No	BSL
Parcel F											
2-Butanone	0.0040 J/J	0.0040 J/J	mg/kg	OMS-28-SB14-1	1 / 1	0.000443	0.0040	2700	NSV	No	BSL
4-Methyl-2-pentanone	0.0014 J/J	0.0014 J/J	mg/kg	OMS-28-SB14-1	1 / 1	0.000221	0.0014	3300	NSV	No	BSL
Acetone	0.083	0.083	mg/kg	OMS-28-SB14-1	1 / 1	0.000443	0.083	7000	NSV	No	BSL
Methylene chloride	0.0019 J/J	0.0019 J/J	mg/kg	OMS-28-SB14-1	1 / 1	0.000886	0.0019	35	NSV	No	BSL
Tetrachloroethene	0.033	0.057 /J	mg/kg	OMS-28-SB19-1	2 / 14	0.000443 - 0.0006	0.057	8.1	NSV	No	BSL

Notes:

(1) Surface soil was collected from 0 to 1 foot. Only detected chemicals are shown.
Surface soil samples were not collected from Parcels B, C, D, and G.
(2) Minimum/maximum detected concentration and associated qualifiers.
(3) Maximum concentration is used for screening.
(4) The screening value is the residential soil value from the Regional Screening Level (RSL) Table based on risk of 1E-06 for carcinogens and HQ of 0.1 for noncarcinogens (USEPA, November 2021).
The value for cyclohexane was used for methylcyclohexane.
(5) Background values are not available.
(6) Rationale Codes:
Selection Reason: ASL - Above Screening Level
Deletion Reason: BSL - Below Screening Level

Bold font indicates selection as a COPC.

Data Qualifiers:

The "/" separates the laboratory added data qualifiers from the validation data qualifiers.
J/ - Estimated result less than the Reporting Detection Limit (RDL) and greater than or equal to the Method Detection Limit (MDL).
/J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Definitions:

mg/kg - Milligrams per Kilogram
COPC - Chemical of Potential Concern
NSV - No Screening Value
USEPA - United States Environmental Protection Agency

Table 3
Identification of COPCs in Subsurface Soil
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical (1)	Minimum Concentration (2)	Maximum Concentration (2)	Units	Sample Designation of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (3)	Screening Value (4)	Background Value (5)	COPC?	Rationale Code (6)
Parcel A											
Tetrachloroethene	**0.002439024**	**53.7**	**mg/kg**	**OMS-28-SB24-3**	**12 / 16**	**0.0006 - 0.464**	**53.7**	**8.1**	**NSV**	**Yes**	**ASL**
Trichloroethene	0.001658768	0.00863747	mg/kg	OMS-28-SB29-3	5 / 16	0.0006 - 0.232	0.00863747	0.41	NSV	No	BSL
Parcel E											
Methylene chloride	0.00909 J/J	0.00909 J/J	mg/kg	OMS-28-SB11-6	1 / 1	0.001	0.00909	35	NSV	No	BSL
Parcel F											
Acetone	0.00616 J/J	0.0098 J/J	mg/kg	OMS-28-SB01-2	2 / 3	0.000358 - 0.000468	0.0098	7000	NSV	No	BSL
Methylene chloride	0.00273 J/J	0.0113	mg/kg	OMS-28-SB01-2	3 / 3	0.000715 - 0.000936	0.0113	35	NSV	No	BSL
Tetrachloroethene	0.001233046 J/J	0.02638191	mg/kg	OMS-28-SB19-5	4 / 28	0.000358 - 0.0006	0.02638191	8.1	NSV	No	BSL
Trichloroethene	0.002512563	0.002512563	mg/kg	OMS-28-SB19-5	1 / 28	0.000179 - 0.0006	0.002512563	0.41	NSV	No	BSL

Notes:

(1) Subsurface soil was collected from 1 to 6 feet. Only detected chemicals are shown.
Subsurface soil samples were not collected from Parcels B, C, D, and G.
(2) Minimum/maximum detected concentration and associated qualifiers.
(3) Maximum concentration is used for screening.
(4) The screening value is the residential soil value from the Regional Screening Level (RSL) Table based on risk of 1E-06 for carcinogens and HQ of 0.1 for noncarcinogens (USEPA, November 2021).
(5) Background values are not available.
(6) Rationale Codes:
Selection Reason: ASL - Above Screening Level
Deletion Reason: BSL - Below Screening Level

Bold font indicates selection as a COPC.

Data Qualifiers:

The "/" separates the laboratory added data qualifiers from the validation data qualifiers.
J/ - Estimated result less than the Reporting Detection Limit (RDL) and greater than or equal to the Method Detection Limit (MDL).
/J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Definitions:

mg/kg - Milligrams per Kilogram
COPC - Chemical of Potential Concern
NSV - No Screening Value
USEPA - United States Environmental Protection Agency

Table 4
Identification of COPCs in Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical (1)	Minimum Concentration (2)	Maximum Concentration (2)	Units	Sample Designation of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (3)	Screening Value (4)	Background Value (5)	COPC?	Rationale Code (6)
Parcel A											
Tetrachloroethene	**0.863 J/J**	**40000**	**ug/L**	**OMS-28-GW22-11**	**15 / 24**	**0.2 - 0.51**	**40000**	**4.1**	**NSV**	**Yes**	**ASL**
Trichloroethene	**0.751 J/J**	**46**	**ug/L**	**OMS-28-GW40-20**	**14 / 24**	**0.2 - 0.51**	**46**	**0.28**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	0.0063 J/J	0.0063 J/J	ug/L	OMS-28-GW41-20	1 / 2	0.0046	0.0063	0.019	NSV	No	BSL
Parcel B											
Tetrachloroethene	0.56 J/J	3.6	ug/L	OMS-28-GW42-12	4 / 11	0.2 - 0.51	3.6	4.1	NSV	No	BSL
Trichloroethene	**0.62 J/J**	**10**	**ug/L**	**OMS-28-GW43-28**	**5 / 11**	**0.2 - 0.51**	**10**	**0.28**	**NSV**	**Yes**	**ASL**
Parcel C											
Methylene chloride	0.709 J/J	0.709 J/J	ug/L	OMS-28-2-011916	1 / 2	0.2	0.709	11	NSV	No	BSL
Trichloroethene	**4.43**	**4.43**	**ug/L**	**OMS-28-GW44-28**	**1 / 5**	**0.2 - 0.51**	**4.43**	**0.28**	**NSV**	**Yes**	**ASL**
Parcel D											
Trichloroethene	**0.584 J/J**	**27.1**	**ug/L**	**OMS-28-GW64-33**	**6 / 18**	**0.2 - 0.51**	**27.1**	**0.28**	**NSV**	**Yes**	**ASL**
Parcel E											
Acetone	5.05 Q/J	5.05 Q/J	ug/L	OMS-28-GW62-19	1 / 11	0.5 - 1	5.05	1800	NSV	No	BSL
cis-1,2-Dichloroethene	**0.521 J/J**	**7.56**	**ug/L**	**OMS-28-GW85-19**	**9 / 32**	**0.2 - 0.4**	**7.56**	**3.6**	**NSV**	**Yes**	**ASL**
Methylene chloride	0.771 J/J	0.771 J/J	ug/L	OMS-28-7-012016	1 / 11	0.2 - 0.4	0.771	11	NSV	No	BSL
Trichloroethene	**0.373 J/J**	**291**	**ug/L**	**OMS-28-GW85-19**	**28 / 68**	**0.2 - 0.51**	**291**	**0.28**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	**0.008 J/J**	**0.034 J/J**	**ug/L**	**OMS-28-GW86-16**	**4 / 32**	**0.0046 - 0.2**	**0.034**	**0.019**	**NSV**	**Yes**	**ASL**
Parcel F											
1,1-Dichloroethene	1.29 J/J	1.29 J/J	ug/L	OMS-28-5_050517	1 / 19	0.2 - 1	1.29	28	NSV	No	BSL
2-Butanone	3.87 J/J	3.87 J/J	ug/L	OMS-28-GW02-19	1 / 19	0.2 - 1	3.87	560	NSV	No	BSL
Acetone	12.2	12.2	ug/L	OMS-28-GW02-19	1 / 19	0.5 - 2.5	12.2	1800	NSV	No	BSL
Carbon disulfide	0.666 J/J	0.666 J/J	ug/L	OMS-28-GW11-11	1 / 19	0.2 - 1	0.666	81	NSV	No	BSL
cis-1,2-Dichloroethene	**0.927 J/J**	**103**	**ug/L**	**OMS-28-5_050517**	**6 / 19**	**0.2 - 1**	**103**	**3.6**	**NSV**	**Yes**	**ASL**
Isopropylbenzene	0.374 J/J	0.374 J/J	ug/L	OMS-28-GW11-11	1 / 19	0.2 - 1	0.374	45	NSV	No	BSL
Methylene chloride	0.527 J/J	0.527 J/J	ug/L	OMS-28-3-012116	1 / 19	0.2 - 1	0.527	11	NSV	No	BSL
Tetrachloroethene	**0.88 J/J**	**460**	**ug/L**	**OMS-28-GW21-12**	**11 / 103**	**0.2 - 1**	**460**	**4.1**	**NSV**	**Yes**	**ASL**
trans-1,2-Dichloroethene	**10.3**	**31.6**	**ug/L**	**OMS-28-5_050517**	**2 / 19**	**0.2 - 1**	**31.6**	**6.8**	**NSV**	**Yes**	**ASL**
Trichloroethene	**0.52 J/J**	**510**	**ug/L**	**OMS-28-GW21-12**	**39 / 103**	**0.2 - 1**	**510**	**0.28**	**NSV**	**Yes**	**ASL**
Vinyl chloride	**0.011 J/J**	**0.18**	**ug/L**	**OMS-28-GW18-18**	**3 / 18**	**0.0046 - 1**	**0.18**	**0.019**	**NSV**	**Yes**	**ASL**
Parcel G											
Methylene chloride	0.504 J/J	0.504 J/J	ug/L	OMS-28-1-012116	1 / 4	0.2	0.504	11	NSV	No	BSL

Notes are shown on the following page.

Table 4
Identification of COPCs in Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Notes:

(1) Only detected chemicals in each groundwater parcel are shown.

(2) Minimum/maximum detected concentration and associated qualifiers.

(3) Maximum concentration is used for screening.

(4) The screening value is the tapwater value from the Regional Screening Level (RSL) Table based on risk of 1E-06 for carcinogens and HQ of 0.1 for noncarcinogens (USEPA, November 2021).
If the maximum detected concentration exceeds the USEPA Maximum Contaminant Level (MCL; March 2018), the chemical is also retained as a COPC.

(5) Background values are not available.

(6) Rationale Codes:
Selection Reason: ASL - Above Screening Level
Deletion Reason: BSL - Below Screening Level

Bold font indicates selection as a COPC.

Data Qualifiers:

The "/" separates the laboratory added data qualifiers from the validation data qualifiers.

J/ - Estimated result less than the Reporting Detection Limit (RDL) and greater than or equal to the Method Detection Limit (MDL).

Q/ - Indicates a non-compliant QC result.

/J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Definitions:

ug/L - Micrograms per Liter

COPC - Chemical of Potential Concern

NSV - No Screening Value

USEPA - United States Environmental Protection Agency

Table 5
Identification of Vapor Intrusion COPCs in Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical (1)	Minimum Concentration (2)	Maximum Concentration (2)	Units	Sample Designation of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening (3)	Screening Value and Source (4)		Background Value (5)	COPC?	Rationale Code (6)
Commercial/Industrial Scenario												
Parcel A												
Tetrachloroethene	**0.863 J/J**	**40,000**	**ug/L**	**OMS-28-GW22-11**	**14 / 22**	**0.2 - 0.51**	**40,000**	**29.7**	**A-1**	**NSV**	**Yes**	**ASL**
Trichloroethene	**0.751 J/J**	**46**	**ug/L**	**OMS-28-GW40-20**	**14 / 22**	**0.2 - 0.51**	**46**	**2.59**	**A-1**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	0.0063 J/J	0.0063 J/J	ug/L	OMS-28-GW41-20	1 / 2	0.0046	0.0063	2.69	A-1	NSV	No	BSL
Parcel B												
Tetrachloroethene	0.56 J/J	3.6	ug/L	OMS-28-GW42-12	4 / 9	0.2 - 0.51	3.6	29.7	A-1	NSV	No	BSL
Trichloroethene	**1**	**10**	**ug/L**	**OMS-28-GW43-28**	**4 / 9**	**0.2 - 0.51**	**10**	**2.59**	**A-1**	**NSV**	**Yes**	**ASL**
Parcel C												
Methylene chloride	0.709 J/J	0.709 J/J	ug/L	OMS-28-2-011916	1 / 2	0.2	0.709	2290	A-1	NSV	No	BSL
Trichloroethene	**4.43**	**4.43**	**ug/L**	**OMS-28-GW44-28**	**1 / 4**	**0.2 - 0.51**	**4.43**	**2.59**	**A-1**	**NSV**	**Yes**	**ASL**
Parcel D												
Trichloroethene	**8.1**	**9.02**	**ug/L**	**OMS-28-GW75-29**	**2 / 9**	**0.2 - 0.51**	**9.02**	**8.86**	**A-2**	**NSV**	**Yes**	**ASL**
Parcel E												
Acetone	5.05 Q/J	5.05 Q/J	ug/L	OMS-28-GW62-19	1 / 10	0.5 - 1	5.05	—	A-1	NSV	No	NSL
cis-1,2-Dichloroethene	0.521 J/J	7.56	ug/L	OMS-28-GW85-19	8 / 23	0.2 - 0.4	7.56	—	A-1	NSV	No	NSL
Methylene chloride	0.771 J/J	0.771 J/J	ug/L	OMS-28-7-012016	1 / 10	0.2 - 0.4	0.771	2290	A-1	NSV	No	BSL
Trichloroethene	**0.373 J/J**	**291**	**ug/L**	**OMS-28-GW85-19**	**23 / 45**	**0.2 - 0.51**	**291**	**2.59**	**A-1**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	0.008 J/J	0.034 J/J	ug/L	OMS-28-GW86-16	4 / 23	0.0046 - 0.2	0.034	2.69	A-1	NSV	No	BSL
Parcel F												
1,1-Dichloroethene	1.29 J/J	1.29 J/J	ug/L	OMS-28-5_050517	1 / 13	0.2 - 1	1.29	93.8	A-1	NSV	No	BSL
2-Butanone	3.87 J/J	3.87 J/J	ug/L	OMS-28-GW02-19	1 / 13	0.2 - 1	3.87	1,120,000	A-1	NSV	No	BSL
Acetone	12.2	12.2	ug/L	OMS-28-GW02-19	1 / 13	0.5 - 2.5	12.2	—	A-1	NSV	No	NSL
Carbon disulfide	0.666 J/J	0.666 J/J	ug/L	OMS-28-GW11-11	1 / 13	0.2 - 1	0.666	598	A-1	NSV	No	BSL
cis-1,2-Dichloroethene	0.927 J/J	103	ug/L	OMS-28-5_050517	6 / 13	0.2 - 1	103	—	A-1	NSV	No	NSL
Isopropylbenzene	0.374 J/J	0.374 J/J	ug/L	OMS-28-GW11-11	1 / 13	0.2 - 1	0.374	489	A-1	NSV	No	BSL
Methylene chloride	0.527 J/J	0.527 J/J	ug/L	OMS-28-3-012116	1 / 13	0.2 - 1	0.527	2290	A-1	NSV	No	BSL
Tetrachloroethene	**1.86**	**460**	**ug/L**	**OMS-28-GW21-12**	**10 / 72**	**0.2 - 1**	**460**	**29.7**	**A-1**	**NSV**	**Yes**	**ASL**
trans-1,2-Dichloroethene	10.3	31.6	ug/L	OMS-28-5_050517	2 / 13	0.2 - 1	31.6	53.2	A-1	NSV	No	BSL
Trichloroethene	**0.52 J/J**	**510**	**ug/L**	**OMS-28-GW21-12**	**38 / 72**	**0.2 - 1**	**510**	**2.59**	**A-1**	**NSV**	**Yes**	**ASL**
Vinyl chloride	0.011 J/J	0.18	ug/L	OMS-28-GW18-18	3 / 12	0.0046 - 1	0.18	2.69	A-1	NSV	No	BSL

Table 5
Identification of Vapor Intrusion COPCs in Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical [1]	Minimum Concentration [2]	Maximum Concentration [2]	Units	Sample Designation of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [3]	Screening Value and Source [4]		Background Value [5]	COPC?	Rationale Code [6]
Residential Scenario												
Parcel A												
Tetrachloroethene	**0.863 J/J**	**40,000**	**ug/L**	**OMS-28-GW22-11**	**14 / 22**	**0.2 - 0.51**	**40,000**	**7.06**	**A-3**	**NSV**	**Yes**	**ASL**
Trichloroethene	**0.751 J/J**	**46**	**ug/L**	**OMS-28-GW40-20**	**14 / 22**	**0.2 - 0.51**	**46**	**0.618**	**A-3**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	0.0063 J/J	0.0063 J/J	ug/L	OMS-28-GW41-20	1 / 2	0.0046	0.0063	0.162	A-3	NSV	No	BSL
Parcel B												
Tetrachloroethene	0.56 J/J	3.6	ug/L	OMS-28-GW42-12	4 / 9	0.2 - 0.51	3.6	7.06	A-3	NSV	No	BSL
Trichloroethene	**1**	**10**	**ug/L**	**OMS-28-GW43-28**	**4 / 9**	**0.2 - 0.51**	**10**	**0.618**	**A-3**	**NSV**	**Yes**	**ASL**
Parcel C												
Methylene chloride	0.709 J/J	0.709 J/J	ug/L	OMS-28-2-011916	1 / 2	0.2	0.709	545	A-3	NSV	No	BSL
Trichloroethene	**4.43**	**4.43**	**ug/L**	**OMS-28-GW44-28**	**1 / 4**	**0.2 - 0.51**	**4.43**	**0.618**	**A-3**	**NSV**	**Yes**	**ASL**
Parcel D [7]												
Trichloroethene	**8.1**	**9.02**	**ug/L**	**OMS-28-GW75-29**	**2 / 9**	**0.2 - 0.51**	**9.02**	**1.42**	**A-4**	**NSV**	**Yes**	**ASL**
Parcel E												
Acetone	5.05 Q/J	5.05 Q/J	ug/L	OMS-28-GW62-19	1 / 10	0.5 - 1	5.05	—	A-3	NSV	No	NSL
cis-1,2-Dichloroethene	0.521 J/J	7.56	ug/L	OMS-28-GW85-19	8 / 23	0.2 - 0.4	7.56	—	A-3	NSV	No	NSL
Methylene chloride	0.771 J/J	0.771 J/J	ug/L	OMS-28-7-012016	1 / 10	0.2 - 0.4	0.771	545	A-3	NSV	No	BSL
Trichloroethene	**0.373 J/J**	**291**	**ug/L**	**OMS-28-GW85-19**	**23 / 45**	**0.2 - 0.51**	**291**	**0.618**	**A-3**	**NSV**	**Yes**	**ASL**
Vinyl Chloride	0.008 J/J	0.034 J/J	ug/L	OMS-28-GW86-16	4 / 23	0.0046 - 0.2	0.034	0.162	A-3	NSV	No	BSL
Parcel F												
1,1-Dichloroethene	1.29 J/J	1.29 J/J	ug/L	OMS-28-5_050517	1 / 13	0.2 - 1	1.29	22.3	A-3	NSV	No	BSL
2-Butanone	3.87 J/J	3.87 J/J	ug/L	OMS-28-GW02-19	1 / 13	0.2 - 1	3.87	267,000	A-3	NSV	No	BSL
Acetone	12.2	12.2	ug/L	OMS-28-GW02-19	1 / 13	0.5 - 2.5	12.2	—	A-3	NSV	No	NSL
Carbon disulfide	0.666 J/J	0.666 J/J	ug/L	OMS-28-GW11-11	1 / 13	0.2 - 1	0.666	142	A-3	NSV	No	BSL
cis-1,2-Dichloroethene	0.927 J/J	103	ug/L	OMS-28-5_050517	6 / 13	0.2 - 1	103	—	A-3	NSV	No	NSL
Isopropylbenzene	0.374 J/J	0.374 J/J	ug/L	OMS-28-GW11-11	1 / 13	0.2 - 1	0.374	116	A-3	NSV	No	BSL
Methylene chloride	0.527 J/J	0.527 J/J	ug/L	OMS-28-3-012116	1 / 13	0.2 - 1	0.527	545	A-3	NSV	No	BSL
Tetrachloroethene	**1.86**	**460**	**ug/L**	**OMS-28-GW21-12**	**10 / 72**	**0.2 - 1**	**460**	**7.06**	**A-3**	**NSV**	**Yes**	**ASL**
trans-1,2-Dichloroethene	**10.3**	**31.6**	**ug/L**	**OMS-28-5_050517**	**2 / 13**	**0.2 - 1**	**31.6**	**12.7**	**A-3**	**NSV**	**Yes**	**ASL**
Trichloroethene	**0.52 J/J**	**510**	**ug/L**	**OMS-28-GW21-12**	**38 / 72**	**0.2 - 1**	**510**	**0.618**	**A-3**	**NSV**	**Yes**	**ASL**
Vinyl chloride	**0.011 J/J**	**0.18**	**ug/L**	**OMS-28-GW18-18**	**3 / 12**	**0.0046 - 1**	**0.18**	**0.162**	**A-3**	**NSV**	**Yes**	**ASL**

Notes are shown on the following page.

Table 5
Identification of Vapor Intrusion COPCs in Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Notes:

— - No Inhalation Toxicity Information

(1) Only detected chemicals in each groundwater parcel are shown.

Parcel G had no detections in shallow groundwater that could migrate into indoor air.

(2) Minimum/maximum detected concentration and associated qualifiers.

(3) Maximum concentration is used for screening.

(4) Screening value is the Vapor Intrusion Screening Level (VISL) target groundwater concentration from USEPA's VISL Calculator accessed online at https://epa-visl.ornl.gov/cgi-bin/visl_search

Output is included in Appendix A on Tables A.1 - A.4. The appropriate table is shown for the respective screening value.

A temperature of 21 degrees Celsius, a target risk of 1E-6, and an HQ of 0.1 were used in the VISL Calculator, with the following exception: An HQ of 1, instead of 0.1, was used for trichloroethene at Parcel D, since it was the only detected chemical.

(5) Background values are not available.

(6) Rationale Codes:

Selection Reason: ASL - Above Screening Level

Deletion Reason: BSL - Below Screening Level; NSL - No Screening Level

(7) There is no current resident at Parcel D to be evaluated for vapor intrusion from groundwater. A resident does exist, however, at Parcel H, which is immediately east of Parcel D. This resident lives within 100 feet of the VOC plume beneath Parcel D and will be evaluated for vapor intrusion using the groundwater data collected at and the COPC identified at Parcel D.

Bold font indicates selection as a COPC.

Data Qualifiers:

The "/" separates the laboratory added data qualifiers from the validation data qualifiers.

J/ - Estimated result less than the Reporting Detection Limit (RDL) and greater than or equal to the Method Detection Limit (MDL).

Q/ - Indicates a non-compliant QC result.

/J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

Definitions:

ug/L - Micrograms per Liter

COPC - Chemical of Potential Concern

NSV - No Screening Value

USEPA - United States Environmental Protection Agency

Table 6
Exposure Point Concentration Summary — Surface Soil
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic [1] Mean	95% UCL [1] (Distribution)		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic [2]	Rationale
Surface Soil	***Parcel A***									
	Tetrachloroethene	mg/kg	54.28	572	Gamma Adjusted KM-UCL	329	329	mg/kg	Max	Footnote (4)

Notes:

(1) Arithmetic mean and 95% Upper Confidence Limit (UCL) were calculated using USEPA's ProUCL Version 5.1.002 statistical software package. Method used to compute selected UCL is shown.
KM - Kaplan-Meier

(2) Statistic: Maximum Detected Value (Max); 95% UCL (95% UCL).

(3) The 95% UCL is lower than the maximum concentration and is selected as the exposure point concentration.

(4) The 95% UCL either could not be calculated or exceeded the maximum concentration; the maximum value was selected as the exposure point concentration.

mg/kg - milligrams per kilogram

Table 7
Exposure Point Concentration Summary — Subsurface Soil
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic [(1)] Mean	95% UCL [(1)] (Distribution)		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic [(2)]	Rationale
Subsurface Soil	***Parcel A***									
	Tetrachloroethene	mg/kg	6.578	20.75	95% KM Chebyshev UCL	53.7	20.75	mg/kg	95% UCL	Footnote (3)

Notes:
(1) Arithmetic mean and 95% Upper Confidence Limit (UCL) were calculated using USEPA's ProUCL Version 5.1.002 statistical software package. Method used to compute selected UCL is shown.
KM - Kaplan-Meier
(2) Statistic: Maximum Detected Value (Max); 95% UCL (95% UCL).
(3) The 95% UCL is lower than the maximum concentration and is selected as the exposure point concentration.
(4) The 95% UCL either could not be calculated or exceeded the maximum concentration; the maximum value was selected as the exposure point concentration.
mg/kg - milligrams per kilogram

Table 8
Exposure Point Concentration Summary — Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic [(1)] Mean	95% UCL [(1)] (Distribution)		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic [(2)]	Rationale
Groundwater	***Parcel A***									
	Tetrachloroethene	ug/L	3447	12235	95% KM Chebyshev UCL	40000	12235	ug/L	95% UCL	Footnote (3)
	Trichloroethene	ug/L	17.8	17.87	95% KM (t) UCL	46	17.87	ug/L	95% UCL	Footnote (3)
	Parcel B									
	Trichloroethene	ug/L	NC	NC		10	10	ug/L	Max	Footnote (4)
	Parcel C									
	Trichloroethene	ug/L	NC	NC		4.43	4.43	ug/L	Max	Footnote (4)
	Parcel D									
	Trichloroethene	ug/L	11.38	19.76	95% KM (t) UCL	27.1	19.76	ug/L	95% UCL	Footnote (3)
	Parcel E									
	cis-1,2-Dichloroethene	ug/L	3.806	4.372	95% KM (t) UCL	7.56	4.372	ug/L	95% UCL	Footnote (3)
	Trichloroethene	ug/L	110.2	144.8	95% KM (t) UCL	291	144.8	ug/L	95% UCL	Footnote (3)
	Vinyl Chloride	ug/L	0.028	0.0346	95% KM (t) UCL	0.034 J/J	0.034	ug/L	Max	Footnote (4)
	Parcel F									
	cis-1,2-Dichloroethene	ug/L	33.54	89.93	95% Student's-t UCL	103	89.93	ug/L	95% UCL	Footnote (3)
	Tetrachloroethene	ug/L	221.3	190.1	95% KM (t) UCL	460	190.1	ug/L	95% UCL	Footnote (3)
	trans-1,2-Dichloroethene	ug/L	20.95	49.87	95% KM Chebyshev UCL	31.6	31.6	ug/L	Max	Footnote (4)
	Trichloroethene	ug/L	174.9	189.3	95% KM (t) UCL	510	189.3	ug/L	95% UCL	Footnote (3)
	Vinyl chloride	ug/L	0.102	0.442	95% KM (Chebyshev) UCL	0.18	0.18	ug/L	Max	Footnote (4)

Notes:

(1) Arithmetic mean and 95% Upper Confidence Limit (UCL) were calculated using USEPA's ProUCL Version 5.1.002 statistical software package. Method used to compute selected UCL is shown.

In evaluating groundwater from Shallow/Intermediate wells, the following locations were identified as the core of the plume for each parcel for calculating the 95% UCL:

Parcel A OMS-28-GW19-12, -GW19-19, -GW19-30, -GW22-11, -GW22-20, -GW22-28, -GW23-12, -GW23-20, -GW23-28, -GW24-12, -GW24-19, -GW24-30, -GW39-13, -GW39-20, -GW39-28, -GW40-13, -GW40-20, and -GW40-28.

Parcel B OMS-28-GW43-12, -GW43-20, and -GW43-28

Parcel C OMS-28-GW44-28

Parcel D OMS-28-GW46-16, -GW46-33, -GW64-16, -GW64-33, and -GW75-29.

Parcel E OMS-28-GW32-12, -GW32-19, -GW32-31, -GW85-13, -GW85-19, -GW85-31, -GW86-12, -GW86-16, -GW86-31, and -GW87-31.

Parcel F OMS-28-5_050517, -5-012016, -GW18-12, -GW18-18, -GW18-30, -GW20-12, -GW20-19, -GW20-28, -GW21-12, -GW21-18, -GW21-30, and -GW51-30.

(2) Statistic: Maximum Detected Value (Max); 95% UCL (95% UCL).

(3) The 95% UCL is lower than the maximum concentration and is selected as the exposure point concentration.

(4) The 95% UCL either could not be calculated or exceeded the maximum concentration; the maximum value was selected as the exposure point concentration.

KM - Kaplan-Meier

NC - not calculated

Table 8
Exposure Point Concentration Summary — Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

ug/L - micrograms per liter

Table 9
Exposure Point Concentration Summary — Groundwater Vapors Migrating into Indoor Air
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Point	Chemical of Potential Concern	Units	Arithmetic [1] Mean	95% UCL [1] (Distribution)		Maximum Concentration (Qualifier)	Exposure Point Concentration			
							Value	Units	Statistic [3]	Rationale
Groundwater	***Parcel A***									
	Tetrachloroethene	ug/L	3734	13751	95% KM Chebyshev UCL	40000	13751	ug/L	95% UCL	Footnote (4)
	Trichloroethene	ug/L	17.8	19.84	95% KM (t) UCL	46	19.84	ug/L	95% UCL	Footnote (4)
	Parcel B									
	Trichloroethene	ug/L	NC	NC		10	10	ug/L	Max	Footnote (5)
	Parcel C									
	Trichloroethene	ug/L	NC	NC		4.43	4.43	ug/L	Max	Footnote (5)
	Parcel D [6]									
	Trichloroethene	ug/L	8.56	14.58	95% KM (t) UCL	9.02	9.02	ug/L	Max	Footnote (5)
	Parcel E									
	Trichloroethene	ug/L	126	230.4	95% Student's-t UCL	291	230.4	ug/L	95% UCL	Footnote (4)
	Parcel F									
	Tetrachloroethene	ug/L	221.3	251.1	95% KM (t) UCL	460	251.1	ug/L	95% UCL	Footnote (4)
	trans-1,2-Dichloroethene	ug/L	20.95	49.87	95% KM Chebyshev UCL	31.6	31.6	ug/L	Max	Footnote (5)
	Trichloroethene	ug/L	174.9	247.3	95% KM (t) UCL	510	247.3	ug/L	95% UCL	Footnote (4)
	Vinyl chloride	ug/L	0.102	0.442	95% KM (Chebyshev) UCL	0.18	0.18	ug/L	Max	Footnote (5)

Notes:

(1) Arithmetic mean and 95% Upper Confidence Limit (UCL) were calculated using USEPA's ProUCL Version 5.1.002 statistical software package. Method used to compute selected UCL is shown.
In evaluating groundwater from Shallow/Intermediate wells, the following locations were identified as the core of the plume for each parcel for calculating the 95% UCL:
Parcel A OMS-28-GW19-12, -GW19-19, -GW22-11, -GW22-20, -GW22-28, -GW23-12, -GW23-20, -GW23-28, -GW24-12, -GW24-19, -GW39-13, -GW39-20, -GW39-28, -GW40-13, -GW40-20, and -GW40-28.
Parcel B OMS-28-GW43-12, -GW43-20, and -GW43-28
Parcel C OMS-28-GW44-28
Parcel D OMS-28-GW46-16, -GW64-16, and -GW75-29.
Parcel E OMS-28-GW32-12, -GW32-19, -GW85-13, -GW85-19, -GW86-12, and -GW86-16.
Parcel F OMS-28-5_050517, -5-012016, -GW18-12, -GW18-18, -GW20-12, -GW20-19, -GW20-28, -GW21-12, and -GW21-18.

(2) Exposure point concentrations (EPCs) will be considered "site concentrations" for comparison to site-specific screening levels (SSSLs) on Table 18 for the vapor intrusion from groundwater pathway.

(3) Statistic: Maximum Detected Value (Max); 95% UCL (95% UCL).

(4) The 95% UCL is lower than the maximum concentration and is selected as the exposure point concentration.

(5) The 95% UCL either could not be calculated or exceeded the maximum concentration; the maximum value was selected as the exposure point concentration.

(6) There is no current resident at Parcel D to be evaluated for vapor intrusion from groundwater. A resident does exist, however, at Parcel H, which is immediately east of Parcel D. This resident lives within 100 feet of the VOC plume beneath Parcel D and will be evaluated for vapor intrusion using the trichloroethene groundwater exposure point concentration determined at Parcel D.

KM - Kaplan-Meier
NC - not calculated

Table 9
Exposure Point Concentration Summary — Groundwater Vapors Migrating into Indoor Air
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

ug/L - micrograms per liter

Table 10
Exposure Factors - Soil (Current/Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Oral	Trespasser	Adolescent	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
		(7-16)		CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens =
				IR-S	Ingestion Rate of Soil	100	mg/day	USEPA, March 1991; USEPA, November 2021	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-C
				RBA	Relative Bioavailability Factor	1 (Arsenic = 0.6)	--	USEPA, December 2012; USEPA, November 2021	
				EF	Exposure Frequency	100	day/yr	(1)	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				ED	Exposure Duration	10	years	USEPA, March 2018	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-N
				BW	Body Weight	45	kg	USEPA, March 2018	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, December 1989	
	Industrial Worker	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens =
				IR-S	Ingestion Rate of Soil	50	mg/day	USEPA, March 1991; USEPA November 2021	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-C
				RBA	Relative Bioavailability Factor	1 (Arsenic = 0.6)	--	USEPA, December 2012; USEPA, November 2021	
				EF	Exposure Frequency	250	day/yr	USEPA, March 1991; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				ED	Exposure Duration	25	years	USEPA, March 1991; USEPA, November 2021	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-N
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, December 1989 (ED x 365 d/y)	

Table 10
Exposure Factors - Soil (Current/Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Trespasser	Adolescent	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
		(7-16)		CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens=
				AF	Adherence Factor	0.2	mg/cm^2-day	USEPA, July 2004	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-C
				ABS	Absorption Fraction	Contaminant-specific	--	USEPA, July 2004	
				SA	Skin Surface Area Available	3280	cm^2	USEPA, September 2011 (2)	Chronic Daily Intake (mg/kg-day) for noncarcinogens=
				EF	Exposure Frequency	100	day/yr	(1)	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-N
				ED	Exposure Duration	10	years	USEPA, March 2018	
				BW	Body Weight	45	kg	USEPA, March 2018	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989	
				AT-N	Averaging Time (Non-Cancer)	3650	days	USEPA, December 1989	
	Industrial Worker	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens=
				AF	Adherence Factor	0.12	mg/cm^2-day	USEPA, September 2011; USEPA, November 2021	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-C
				ABS	Absorption Fraction	chemical-specific	--	USEPA, July 2004	
				SA	Skin Surface Area Available	3527	cm^2	USEPA, September 2011; USEPA, November 2021 (3)	Chronic Daily Intake (mg/kg-day) for noncarcinogens=
				EF	Exposure Frequency	250	day/yr	USEPA, March 1991; USEPA, November 2021	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-N
				ED	Exposure Duration	25	years	USEPA, March 1991; USEPA, November 2021	
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, December 1989 (ED x 365 d/y)	

Notes:

(1) Based on 2 days per week for 12 months (50 weeks) of the year.

(2) Represents face, hands, forearms and lower legs.

(3) Represents head, hands, and forearms. Value for composite worker used.

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, March 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03.

USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E), Office of Emergency and Remedial Response. EPA/540/R99/005.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA, December 2012. OSWER Directive 9200.1-113: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil.

USEPA, March 2018. Region 4 Human Health Risk Assessment Supplemental Guidance.

USEPA, November 2021. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

Table 11
Exposure Factors - Soil [1] (Current/Future - Inhalation)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Current/Future
Medium:	Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Trespasser	Adolescent	Inhalation of Volatiles	CS	Chemical Concentration in Soil	--	mg/kg	--	
		(7-16)		CA	Chemical Concentration in Air	Modeled	ug/m3	CS / VF * CF	Exposure Concentration for carcinogens =
				CF	Conversion Factor	1.00E+03	ug/mg		CA x ET x EF x ED x 1/AT-C
				VF	Volatilization Factor	2.35E+03	m^3/kg	USEPA, November 2021a (2)	
				ET	Exposure Time	2	hr/day	USEPA, January 2009	Exposure Concentration for noncarcinogens =
				EF	Exposure Frequency	100	day/yr	(3)	CA x ET x EF x ED x 1/AT-N
				ED	Exposure Duration	10	years	USEPA, March 2018	where:
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA = CS / VF * CF
				AT-N	Averaging Time (Non-Cancer)	87,600	hours	ED x 365 d/yr x 24 hrs/day	
	Industrial Worker	Adult	Inhalation of Volatiles	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	CS / VF * CF	Exposure Concentration for carcinogens =
				CF	Conversion Factor	1.00E+03	ug/mg	--	CA x ET x EF x ED x 1/AT-C
				VF	Volatilization Factor	2.35E+03	m^3/kg	USEPA, November 2021a (2)	
				ET	Exposure Time	8	hr/day	USEPA, November 2021b	Exposure Concentration for noncarcinogens =
				EF	Exposure Frequency	250	day/yr	USEPA, March 1991; USEPA, November 2021b	CA x ET x EF x ED x 1/AT-N
				ED	Exposure Duration	25	years	USEPA, March 1991; USEPA, November 2021b	where:
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA = CS / VF * CF
				AT-N	Averaging Time (Non-Cancer)	219,000	hours	ED x 365 d/yr x 24 hrs/day	

Notes:

(1) Inhalation of volatiles will only be evaluated for surface soil.

(2) VF shown is for tetrachloroethene, the only chemical of potential concern evaluated in soil.

(3) Based on 2 days per week for 12 months (50 weeks) of the year.

USEPA, March 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03.

USEPA, January 2009 Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. EPA-540-R-070-002.

USEPA, March 2018. Region 4 Human Health Risk Assessment Supplemental Guidance.

USEPA, November 2021a. Regional Screening Level Calculator accessed at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

USEPA, November 2021b. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

Table 12
Exposure Factors - Soil (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Oral	Construction Worker	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens =
				IR-S	Ingestion Rate of Soil	330	mg/day	USEPA, December 2002; USEPA, November 2021	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-C
				RBA	Relative Bioavailability Factor	1 (Arsenic = 0.6)	--	USEPA, December 2012; USEPA, November 2021	
				EF	Exposure Frequency	250	day/yr	USEPA, December 2002; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021	CS x IR-S x RBA x EF x ED x CF x 1/BW x 1/AT-N
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, December 1989 (ED x 365 d/y)	
	Resident	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens =
				IR-Sa	Ingestion Rate of Soil - adult	100	mg/day	USEPA, March 1991; USEPA, November 2021	CS x IR-Sa x RBA x EFa x EDa x CF x 1/BWa x 1/AT-C +
				IR-Sc	Ingestion Rate of Soil - child	200	mg/day	USEPA, March 1991; USEPA, November 2021	CS x IR-Sc x RBA x EFc x EDc x CF x 1/BWc x 1/AT-C
				RBA	Relative Bioavailability Factor	1 (Arsenic = 0.6)	--	USEPA, December 2012; USEPA, November 2021	
				EFa	Exposure Frequency - adult	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EFc	Exposure Frequency - child	350	day/yr	USEPA, March 1991; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				EDa	Exposure Duration - adult	20	years	USEPA, November 2021	CS x IR-Sa x RBA x EFa x EDres x CF x 1/BWa x 1/AT-N
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	
				EDres	Exposure Duration - resident	26	years	USEPA, September 2011; USEPA, November 2021	
				BWa	Body Weight - adult	80	kg	USEPA, September 2011; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9490	days	USEPA, December 1989 (ED x 365 d/y)	
		Child (0-6)	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				IR-Sc	Ingestion Rate of Soil - child	200	mg/day	USEPA, March 1991; USEPA, November 2021	CS x IR-Sc x RBA x EFc x EDc x CF x 1/BWc x 1/AT-N
				RBA	Relative Bioavailability Factor	1 (Arsenic = 0.6)	--	USEPA, December 2012; USEPA, November 2021	
				EFc	Exposure Frequency - child	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, December 1989 (ED x 365 d/y)	

Table 12
Exposure Factors - Soil (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens=
				AF	Adherence Factor	0.3	mg/cm^2-day	USEPA, December 2002; USEPA, November 2021	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-C
				ABS	Absorption Fraction	chemical-specific	--	USEPA, July 2004	
				SA	Skin Surface Area Available	3527	cm^2	USEPA, September 2011; USEPA, November 2021 (1)	Chronic Daily Intake (mg/kg-day) for noncarcinogens=
				EF	Exposure Frequency	250	day/yr	USEPA, December 2002; USEPA, November 2021	CS x SA x AF x ABS x EF x ED x CF x 1/BW x 1/AT-N
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021	
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, December 1989 (ED x 365 d/y)	
	Resident	Adult	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for carcinogens=
				AFa	Adherence Factor - adult	0.07	mg/cm^2-day	USEPA, December 2002; USEPA, November 2021	CS x SAa x AFa x ABS x EFa x EDa x CF x 1/BWa x 1/AT-C +
				AFc	Adherence Factor - child	0.2	mg/cm^2-day	USEPA, December 2002; USEPA, November 2021	CS x SAc x AFc x ABS x EFc x EDc x CF x 1/BWc x 1/AT-C
				ABS	Absorption Fraction	chemical-specific	--	USEPA, July 2004	
				SAa	Skin Surface Area Available - adult	6032	cm^2	USEPA, September 2011; USEPA, November 2021 (2)	Chronic Daily Intake (mg/kg-day) for noncarcinogens=
				SAc	Skin Surface Area Available - child	2373	cm^2	USEPA, September 2011; USEPA, November 2021 (2)	CS x SAa x AFa x ABS x EFa x EDres x CF x 1/BWa x 1/AT-N
				EFa	Exposure Frequency - adult	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EFc	Exposure Frequency - child	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EDa	Exposure Duration - adult	20	years	USEPA, November 2021	
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	
				EDres	Exposure Duration - resident	26	years	USEPA, September 2011; USEPA, November 2021	
				BWa	Body Weight - adult	80	kg	USEPA, September 2011; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9490	days	USEPA, December 1989 (ED x 365 d/y)	

Table 12
Exposure Factors - Soil (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Resident	Child	Soil	CS	Chemical Concentration in Soil	--	mg/kg	--	
		(0-6)		CF	Conversion Factor	1.00E-06	kg/mg	--	Chronic Daily Intake (mg/kg-day) for noncarcinogens=
				AFc	Adherence Factor	0.2	mg/cm^2-day	USEPA, December 2002; USEPA, November 2021	CS x SAc x AFc x ABS x EFc x EDc x CF x 1/BWc x 1/AT-N
				ABS	Absorption Fraction	chemical-specific	--	USEPA, July 2004	
				SAc	Skin Surface Area Available	2373	cm^2	USEPA, September 2011; USEPA, November 2021 (2)	
				EFc	Exposure Frequency	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EDc	Exposure Duration	6	years	USEPA, March 1991; USEPA, November 2021	
				BWc	Body Weight	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, December 1989 (ED x 365 d/y)	

Notes:

(1) Represents head, hands, and forearms.

(2) Represents head, hands, forearms, lower legs, and feet.

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, March 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03.

USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E), Office of Emergency and Remedial Response. EPA/540/R99/005.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA, December 2012. OSWER Directive 9200.1-113: Compilation and Review of Data on Relative Bioavailability of Arsenic in Soil.

USEPA, November 2021. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

Table 13
Exposure Factors - Soil [1] (Future - Inhalation)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Soil
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Inhalation of Volatiles	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	CS / VF * CF	Exposure Concentration for carcinogens =
				CF	Conversion Factor	1.00E+03	ug/mg	--	CA x ET x EF x ED x 1/AT-C
				VF	Volatilization Factor	5.09E+02	m^3/kg	USEPA, November 2021a (2)	
				ET	Exposure Time	8	hr/day	USEPA, November 2021b	Exposure Concentration for noncarcinogens =
				EF	Exposure Frequency	250	day/yr	USEPA, December 2002; USEPA, November 2021b	CA x ET x EF x ED x 1/AT-N
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021b	where:
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA = CS / VF * CF
				AT-N	Averaging Time (Non-Cancer)	8,760	hours	ED x 365 d/yr x 24 hrs/day	
	Resident	Adult	Inhalation of Volatiles	CS	Chemical Concentration in Soil	--	mg/kg	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	CS / VF * CF	Exposure Concentration for carcinogens =
				CF	Conversion Factor	1.00E+03	ug/mg	--	CA x ET x EF x ED x 1/AT-C
				VF	Volatilization Factor	2.35E+03	m^3/kg	USEPA, November 2021a (2)	
				ET	Exposure Time	24	hr/day	USEPA, November 2021b	Exposure Concentration for noncarcinogens =
				EF	Exposure Frequency	350	day/yr	USEPA, March 1991; USEPA, November 2021b	CA x ET x EF x ED x 1/AT-N
				ED	Exposure Duration	26	years	USEPA, September 2011; USEPA, November 2021b	where:
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA = CS / VF * CF
				AT-N	Averaging Time (Non-Cancer)	227,760	hours	ED x 365 d/yr x 24 hrs/day	
		Child	Inhalation of Volatiles	CS	Chemical Concentration in Soil	--	mg/kg	--	
		(0-6)		CA	Chemical Concentration in Air	Modeled	ug/m3	CS / VF * CF	Exposure Concentration for noncarcinogens =
				CF	Conversion Factor	1.00E+03	ug/mg	--	CA x ET x EF x ED x 1/AT-N
				VF	Volatilization Factor	2.35E+03	m^3/kg	USEPA, November 2021a (2)	where:
				ET	Exposure Time	24	hr/day	USEPA, November 2021b	CA = CS / VF * CF
				EF	Exposure Frequency	350	day/yr	USEPA, March 1991; USEPA, November 2021b	
				ED	Exposure Duration	6	years	USEPA, March 1991; USEPA, November 2021b	
				AT-N	Averaging Time (Non-Cancer)	52,560	hours	ED x 365 d/yr x 24 hrs/day	

Notes:

(1) For the adult and child resident, inhalation of volatiles will only be evaluated for surface soil.

(2) VF shown is for tetrachloroethene, the only chemical of potential concern evaluated in soil.

USEPA, March 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03.

USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA, November 2021a. Regional Screening Level Calculator accessed at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

USEPA, November 2021b. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

Table 14
Exposure Factors - Groundwater (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Oral	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				IR-W	Ingestion Rate of Groundwater	0.02	l/day	VDEQ, January 2022	Chronic Daily Intake (mg/kg-day) for carcinogens =
				EF	Exposure Frequency	250	day/yr	USEPA, December 2002; USEPA, November 2021	CW x IR-W x EF x ED x 1/BW x 1/AT-C
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	CW x IR-W x EF x ED x 1/BW x 1/AT-N
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	365	days	USEPA, December 1989 (ED x 365 d/y)	
	Industrial Worker	Adult	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				IR-W	Ingestion Rate of Groundwater	1	l/day	USEPA, January 2014	Chronic Daily Intake (mg/kg-day) for carcinogens =
				EF	Exposure Frequency	250	day/yr	USEPA, March 1991; USEPA, November 2021	CW x IR-W x EF x ED x 1/BW x 1/AT-C
				ED	Exposure Duration	25	years	USEPA, March 1991; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	CW x IR-W x EF x ED x 1/BW x 1/AT-N
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9125	days	USEPA, December 1989 (ED x 365 d/y)	
	Resident	Adult	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				IR-Wa	Ingestion Rate of Groundwater - adult	2.5	L/day	USEPA, September 2011; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for carcinogens =
				IR-Wc	Ingestion Rate of Groundwater - child	0.78	L/day	USEPA, September 2011; USEPA, November 2021	CW x IR-Wa x EFa x EDa x 1/BWa x 1/AT-C +
				EFa	Exposure Frequency - adult	350	day/yr	USEPA, March 1991; USEPA, November 2021	CW x IR-Wc x EFc x EDc x 1/BWc x 1/AT-C
				EFc	Exposure Frequency - child	350	day/yr	USEPA, March 1991; USEPA, November 2021	
				EDa	Exposure Duration - adult	20	years	USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	CW x IR-Wa x EFa x EDres x 1/BWa x 1/AT-N
				EDres	Exposure Duration - resident	26	years	USEPA, September 2011; USEPA, November 2021	
				BWa	Body Weight - adult	80	kg	USEPA, September 2011; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	25550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time (Non-Cancer)	9490	days	USEPA, December 1989 (ED x 365 d/y)	
		Child	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				IR-Wc	Ingestion Rate of Groundwater - child	0.78	L/day	USEPA, September 2011; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				EFc	Exposure Frequency - child	350	day/yr	USEPA, March 1991; USEPA, November 2021	CW x IR-Wc x EFc x EDc x 1/BWc x 1/AT-N
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-N	Averaging Time (Non-Cancer)	2190	days	USEPA, December 1989 (ED x 365 d/y)	

Table 14
Exposure Factors - Groundwater (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for carcinogens = DA-event x EV x ED x EF x SA x 1/BW x 1/AT
				Kp	Dermal Permeability Coefficient	Chemical-specific	cm/hr	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for noncarcinogens = DA-event x EV x ED x EF x SA x 1/BW x 1/AT-N
				SA	Body Area Available for Contact	3527	cm^2	USEPA, September 2011; USEPA, November 2021 (1)	Where:
				tau-event	Lag Time per Event	Chemical-specific	hours/event	USEPA, July 2004	For organic compounds in which t-event is less than or equal to t-tau:
				t-event	Event Duration	4	hours/event	VDEQ, January 2022	DA-event (Absorbed Dose per Event [mg/cm2-event]) = 2 x FA x Kp x CW x CF x SQRT([6 x tau-event x t-event] / π)
				B	Ratio of Kp of a Compound through the Stratum Corneum Relative to Its Kp across the Viable Epidermis	Chemical-specific	unitless	USEPA, July 2004	For organics where t-event is greater than t-tau:
				EV	Event Frequency	1	event/day	USEPA, July 2004	DA-event = FA x Kp x CW x CF x {[t-event/(1+B)] +
				EF	Exposure Frequency	250	day/yr	USEPA, December 2002; USEPA, November 2021	2 x tau-event x [(1+3B + 3B 2) / (1 + B)2] }
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021	
				CF	Conversion Factor	1000	cm^3/L	--	For inorganic compounds,
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	DA-event = Kp x CW x CF x t-event
				AT-C	Averaging Time, carcinogens	25,550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time, noncarcinogens	365	days	USEPA, December 1989 (ED x 365 d/y)	
	Industrial Worker	Adult	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				FA	Fraction Absorbed Water	Chemical-specific	unitless	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for carcinogens = DA-event x EV x ED x EF x SA x 1/BW x 1/AT
				Kp	Dermal Permeability Coefficient	Chemical-specific	cm/hr	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for noncarcinogens = DA-event x EV x ED x EF x SA x 1/BW x 1/AT-N
				SA	Body Area Available for Contact	950	cm^2	USEPA, September 2011; (2)	Where:
				tau-event	Lag Time per Event	Chemical-specific	hours/event	USEPA, July 2004	For organic compounds in which t-event is less than or equal to t-tau:
				t-event	Event Duration	0.71	hours/event	USEPA, September 2011; USEPA, November 2021 (3)	DA-event (Absorbed Dose per Event [mg/cm2-event]) = 2 x FA x Kp x CW x CF x SQRT([6 x tau-event x t-event] / π)
				B	Ratio of Kp of a Compound through the Stratum Corneum Relative to Its Kp across the Viable Epidermis	Chemical-specific	unitless	USEPA, July 2004	For organics where t-event is greater than t-tau:
				EV	Event Frequency	1	event/day	USEPA, July 2004	DA-event = FA x Kp x CW x CF x {[t-event/(1+B)] +
				EF	Exposure Frequency	250	day/yr	USEPA, March 1991; USEPA, November 2021	2 x tau-event x [(1+3B + 3B 2) / (1 + B)2] }
				ED	Exposure Duration	25	years	USEPA, March 1991; USEPA, November 2021	
				CF	Conversion Factor	1000	cm^3/L	--	For inorganic compounds,
				BW	Body Weight	80	kg	USEPA, September 2011; USEPA, November 2021	DA-event = Kp x CW x CF x t-event
				AT-C	Averaging Time, carcinogens	25,550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time, noncarcinogens	9125	days	USEPA, December 1989 (ED x 365 d/y)	

Table 14
Exposure Factors - Groundwater (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Resident	Adult	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				FA	Fraction Absorbed Water	chemical-specific	unitless	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for carcinogens =
				Kp	Dermal Permeability Coefficient	chemical-specific	cm/hr	USEPA, July 2004	DA-event x EVa x EDa x EFa x SAa x 1/BWa x 1/AT-C + DA-event x EVc x EDc x EFc x SAc x 1/BWc x 1/AT-C
				SAa	Body Area Available for Contact - adult	19652	cm^2	USEPA, April 2014; USEPA, November 2021	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				SAc	Body Area Available for Contact - child	6365	cm^2	USEPA, April 2014; USEPA, November 2021	DA-event x EVa x EDres x EFa x SAa x 1/BWa x 1/AT-N
				tau-event	Lag Time per Event	chemical-specific	hours/event	USEPA, July 2004	
				t-eventa	Event Duration - adult	0.71	hours/event	USEPA, September 2011; USEPA, November 2021	Where:
				t-eventc	Event Duration - adult	0.54	hours/event	USEPA, September 2011; USEPA, November 2021	For organic compounds in which t-event is less than or equal to t-tau:
				B	Ratio of Kp of a Compound through the Stratum Corneum Relative to Its Kp across the Viable Epidermis	chemical-specific	unitless	USEPA, July 2004	DA-event (Absorbed Dose per Event [mg/cm2-event]) = 2 x FA x Kp x CW x CF x SQRT([6 x tau-event x t-event] / π)
				EVa	Event Frequency - adult	1	event/day	USEPA, July 2004	For organics where t-event is greater than t-tau:
				EVc	Event Frequency - child	1	event/day	USEPA, July 2004	DA-event = FA x Kp x CW x CF x {[t-event/(1+B)] +
				EFa	Exposure Frequency - adult	350	days/year	USEPA, March 1991; USEPA, November 2021	2 x tau-event x [$(1+3B + 3B^2) / (1 + B)^2$] }
				EFc	Exposure Frequency - child	350	days/year	USEPA, March 1991; USEPA, November 2021	
				EDa	Exposure Duration - adult	20	years	USEPA, November 2021	For inorganic compounds,
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	DA-event = Kp x CW x CF x t-event
				EDres	Exposure Duration - resident	26	years	USEPA, September 2011; USEPA, November 2021	
				CF	Conversion Factor	1000	cm^3/L	--	
				BWa	Body Weight - adult	80	kg	USEPA, September 2011; USEPA, November 2021	
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	
				AT-C	Averaging Time, carcinogens	25,550	days	USEPA, December 1989 (70 y x 365 d/y)	
				AT-N	Averaging Time, noncarcinogens	9490	days	USEPA, December 1989 (ED x 365 d/y)	

Table 14
Exposure Factors - Groundwater (Future - Oral and Dermal)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Dermal	Resident	Child	Tap Water	CW	Chemical Concentration in Groundwater	--	mg/l	--	
				FA	Fraction Absorbed Water	chemical-specific	unitless	USEPA, July 2004	Chronic Daily Intake (mg/kg-day) for noncarcinogens =
				Kp	Dermal Permeability Coefficient	chemical-specific	cm/hr	USEPA, July 2004	DA-event x EVc x EDc x EFc x SAc x 1/BWc x 1/AT-N
				SAc	Body Area Available for Contact - child	6365	cm^2	USEPA, April 2014; USEPA, November 2021	Where:
				tau-event	Lag Time per Event	chemical-specific	hours/event	USEPA, July 2004	For organic compounds in which t-event is less than or equal to t-tau:
				t-eventc	Event Duration - child	0.54	hours/event	USEPA, September 2011; USEPA, November 2021	DA-event (Absorbed Dose per Event [mg/cm2-event]) = 2 x FA x Kp x CW x CF x SQRT([6 x tau-event x t-event] / π)
				B	Ratio of Kp of a Compound through the Stratum Corneum Relative to Its Kp across the Viable Epidermis	chemical-specific	unitless	USEPA, July 2004	For organics where t-event is greater than t-tau:
				EVc	Event Frequency - child	1	event/day	USEPA, July 2004	DA-event = FA x Kp x CW x CF x {[t-event/(1+B)] +
				EFc	Exposure Frequency - child	350	days/year	USEPA, March 1991; USEPA, November 2021	2 x tau-event x [$(1+3B+3B^2) / (1+B)^2$] }
				EDc	Exposure Duration - child	6	years	USEPA, March 1991; USEPA, November 2021	
				CF	Conversion Factor	1000	cm^3/L	--	For inorganic compounds,
				BWc	Body Weight - child	15	kg	USEPA, March 1991; USEPA, November 2021	DA-event = Kp x CW x CF x t-event
				AT-N	Averaging Time, noncarcinogens	2190	days	USEPA, December 1989 (ED x 365 d/y)	

Notes:

(1) Represents head, hands, and forearms.

(2) Represents area of hands.

(3) Adult resident t-event value was conservatively used for Industrial Worker.

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A), Office of Emergency and Remedial Response. EPA/540/1-89/002.

USEPA, March 1991. Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03.

USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E), Office of Emergency and Remedial Response. EPA/540/R99/005.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA January 2014. Region 4 Human Health Risk Assessment Supplemental Guidance. Draft Final.

USEPA, April 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120.

USEPA, November 2021. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

VDEQ, January 2022. Virginia Department of Environmental Quality - Virginia Unified Risk Assessment Model - VURAM User Guide for Risk Assessors

Table 15
Exposure Factors - Groundwater (Current/Future - Inhalation from Vapor Intrusion)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Current/Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Resident [1]	Adult and Child	Indoor Air via Vapor Intrusion	CW	Chemical Concentration in Groundwater	--	ug/L	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	(2)	Exposure Concentration for carcinogens =
				ET	Exposure Time (Indoor Air)	24	hr/day	USEPA, November 2021	CA x ET x EF x ED x 1/AT-C
				EF	Exposure Frequency	350	day/yr	USEPA, December 1991; USEPA, November 2021	
				ED	Exposure Duration	26	years	USEPA, September 2011; USEPA, November 2021	Exposure Concentration for noncarcinogens =
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA x ET x EF x ED x 1/AT-N
				AT-N	Averaging Time (Non-Cancer)	227,760	hours	ED x 365 d/yr x 24 hrs/day	

Notes:

(1) Under current conditions, a resident exists only at Parcel H, which is immediately east of Parcel D. This resident lives within 100 feet of the VOC plume beneath Parcel D and will be evaluated for vapor intrusion using groundwater data collected at Parcel D.

(2) Calculated using Johnson and Ettinger Indoor Air model.

USEPA, December 1991. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluaion Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). EPA/540/R-92/003.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA, November 2021. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

Table 16
Exposure Factors - Groundwater (Future - Inhalation from a Trench, Showering, and Vapor Intrusion)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Air

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/ Model Name
Inhalation	Construction Worker	Adult	Vapors from Volatilization (Trench)	CW	Chemical Concentration in Groundwater	--	ug/L	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	(1)	Exposure Concentration (ug/m3) for carcinogens = CA x ET x EF x ED x 1/AT-C
				ET	Exposure Time	4	hours/day	VDEQ, January 2022	
				EF	Exposure Frequency	250	day/yr	USEPA, December, 1991; USEPA, April 2014	
				ED	Exposure Duration	1	years	USEPA, December 2002; USEPA, November 2021	Exposure Concentration (ug/m3) for noncarcinogens = CA x ET x EF x ED x 1/AT-N
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	
				AT-N	Averaging Time (Non-Cancer)	8,760	hours	ED x 365 d/yr x 24 hrs/day	
	Resident	Adult	Vapors from Volatilization (Showering)	CW	Chemical Concentration in Groundwater	--	ug/L	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	CW x K	Exposure Concentration (ug/m3) for carcinogens = CA x ET x EF x ED x 1/AT-C
				K	Andelman Volatilization Factor	0.5	L/m3	USEPA, December, 1991	
				ET	Exposure Time (Indoor Air)	0.71	hr/day	USEPA, November 2021	
				EF	Exposure Frequency	350	day/yr	USEPA, December 1991; USEPA, November 2021	Exposure Concentration (ug/m3) for noncarcinogens = CA x ET x EF x ED x 1/AT-N
				ED	Exposure Duration	26	years	USEPA, September 2011; USEPA, November 2021	
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	
				AT-N	Averaging Time (Non-Cancer)	227,760	hours	ED x 365 d/yr x 24 hrs/day	
	Industrial Worker	Adult	Indoor Air via Vapor Intrusion	CW	Chemical Concentration in Groundwater	--	ug/L	--	
				CA	Chemical Concentration in Air	Modeled	ug/m3	(2)	Exposure Concentration for carcinogens =
				ET	Exposure Time (Indoor Air)	8	hr/day	USEPA, April 2014	CA x ET x EF x ED x 1/AT-C
				EF	Exposure Frequency	250	day/yr	USEPA, December, 1991; USEPA, April 2014	
				ED	Exposure Duration	25	years	USEPA, December, 1991; USEPA, April 2014	Exposure Concentration for noncarcinogens =
				AT-C	Averaging Time (Cancer)	613,200	hours	70 yr [lifetime]x 365 d/yr x 24 hrs/day	CA x ET x EF x ED x 1/AT-N
				AT-N	Averaging Time (Non-Cancer)	219,000	hours	ED x 365 d/yr x 24 hrs/day	

Notes:

(1) Calculated Virginia Trench Model.

(2) Calculated using Johnson and Ettinger Indoor Air model.

USEPA, December 1991. Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluaion Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). EPA/540/R-92/003.

USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-09/052F.

USEPA, April 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120.

USEPA, November 2021. Regional Screening Table User's Guide. Table 1. Standard Default Factors.

VDEQ, January 2022. Virginia Department of Environmental Quality - Virginia Unified Risk Assessment Model - VURAM User Guide for Risk Assessors

Table 17
Toxicity Factors
Alabama Army National Guard OMS #28
Mobile, Alabama

Analyte	SFo $(mg/kg\text{-}day)^{-1}$	Source (1)	IUR $(ug/m^3)^{-1}$	Source (1)	Chronic				Subchronic				GIABS (2)
					RfDo mg/kg-day	Source (1)	RfCi ug/m^3	Source (1)	RfDo mg/kg-day	Source (1)	RfCi ug/m^3	Source (1)	
cis-1,2-Dichloroethene	ND	—	ND	—	2.00E-03	I	ND	—	2.00E-02	P	ND	—	1
Tetrachloroethene	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E+01	I	8.00E-03	A	4.10E+01	A	1
trans-1,2-dichloroethene	ND	—	ND	—	2.00E-02	I	4.00E+01	P	2.00E-01	A	7.90E+02	A	1
Trichloroethylene	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E+00	I	5.00E-04	A	2.20E+00	A	1
Vinyl chloride	7.20E-01	I	4.40E-06	I	3.00E-03	I	8.00E+01	A	3.00E-03	I	8.00E+01	A	1

Notes:

(1) Sources for toxicity factors are as follows:

A - Agency for Toxic Substances and Disease Registry (ATSDR)
Toxicological Profile for 1,2-dichloroethene (August 1996)
Toxicological Profile for Tetrachloroethylene (June 2019)
Toxicological Profile for Trichloroethylene (June 2019)
Toxicological Profile for Vinyl Chloride (July 2006)

I - USEPA's Integrated Risk Information System (IRIS). Searched February 16, 2020.
The chronic RfDo for vinyl chloride was used as the subchronic value.

P - Provisional Peer-Reviewed Toxicity Value (PPRTV)
Provisional Peer-Reviewed Toxicity Values for cis-1,2-dichloroethylene (February 2011)
Provisional Peer-Reviewed Toxicity Values for trans-1,2-dichloroethylene (September 2020)

(2) Source of GIABS values is USEPA's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final (July 2004).

GIABS - Gastrointestinal Absorption Factor
IUR - Inhalation Unit Rate
ND - No Data
RfCi - Reference Concentration (Inhalation)
RfDo - Reference Dose (Oral)
SFo - Slope Factor (Oral)

Table 18
Summary of Risks and Hazards and COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Chemical	**Cancer Risk**	**Noncancer Hazard**	**Chemicals Contributing to Risk and Hazard (COCs)**
PARCEL A			
Current and Future Trespasser			
Surface Soil	2.E-07	0.1	—
Total	2.E-07	0.1	
Future Construction Worker			
Surface Soil	6.E-07	4	PCE
Subsurface Soil	4.E-08	0.2	—
Groundwater	4.E-05	236	PCE, TCE
Total	4.E-05	240	
Future Industrial Worker			
Surface Soil	3.E-06	0.8	PCE
Subsurface Soil	7.E-09	0.001	—
Groundwater	9.E-05	21	PCE, TCE
Total	1.E-04	22	
Future Resident Adult			
Surface Soil	1.E-05	3	PCE
Subsurface Soil	6.E-08	0.004	—
Groundwater	7.E-04	131	PCE, TCE
Total	7.E-04	134	
Future Resident Child			
Surface Soil	NA	4	PCE
Subsurface Soil	NA	0.04	—
Groundwater	NA	187	PCE, TCE
Total	NA	191	
PARCEL B			
Current and Future Trespasser			
Surface Soil (Not located in soil source area)	—	—	—
Future Construction Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	5.E-07	4	TCE
Total	5.E-07	4	
Future Industrial Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	1.E-06	0.2	—
Total	1.E-06	0.2	
Future Resident Adult			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	2.E-05	1	—
Total	2.E-05	1	
Future Resident Child			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	NA	1	—
Total	NA	1	

Table 18
Summary of Risks and Hazards and COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Chemical	**Cancer Risk**	**Noncancer Hazard**	**Chemicals Contributing to Risk and Hazard (COCs)**
PARCEL C			
Current and Future Trespasser			
Surface Soil (Not located in soil source area)	—	—	—
Future Construction Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	2.E-07	2	TCE
Total	2.E-07	2	
Future Industrial Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	7.E-07	0.09	—
Total	7.E-07	0.09	
Future Resident Adult			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	1.E-05	0.5	—
Total	1.E-05	0.5	
Future Resident Child			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	NA	0.6	—
Total	NA	0.6	
PARCEL D			
Current and Future Trespasser			
Surface Soil (Not located in soil source area)	—	—	—
Future Construction Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	1.E-06	8	TCE
Total	1.E-06	8	
Future Industrial Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	3.E-06	0.4	—
Total	3.E-06	0.4	
Future Resident Adult			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	4.E-05	2	TCE
Total	4.E-05	2	
Future Resident Child			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater	NA	3	TCE
Total	NA	3	

Table 18
Summary of Risks and Hazards and COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Chemical	Cancer Risk	Noncancer Hazard	Chemicals Contributing to Risk and Hazard (COCs)
PARCEL E			
Current Industrial Worker			
Surface Soil (No COPCs Identified) [(2)]	—	—	—
Groundwater (No COPCs Identified) [(2)]	—	—	—
Current and Future Trespasser			
Surface Soil (No COPCs identified)	—	—	—
Future Construction Worker			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	7.E-06	55	TCE
Total	7.E-06	55	
Future Industrial Worker			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	2.E-05	3	TCE
Total	2.E-05	3	
Future Resident Adult			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	3.E-04	19	TCE, VC
Total	3.E-04	19	
Future Resident Child			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	NA	24	cis-1,2-DCE [(3)], TCE
Total	NA	24	
PARCEL F			
Current and Future Trespasser			
Surface Soil (No COPCs identified)	—	—	—
Future Construction Worker			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	1.E-05	76	PCE, TCE
Total	1.E-05	76	
Future Industrial Worker			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	3.E-05	5	cis-1,2-DCE [(3)], PCE, TCE
Total	3.E-05	5	
Future Resident Adult			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	4.E-04	27	cis-1,2-DCE, PCE, TCE, trans-1,2-DCE [(3)], VC
Total	4.E-04	27	
Future Resident Child			
Surface Soil (No COPCs identified)	—	—	—
Subsurface Soil (No COPCs identified)	—	—	—
Groundwater	NA	36	cis-1,2-DCE, PCE, trans-1,2-DCE [(3)], TCE
Total	NA	36	

Table 18
Summary of Risks and Hazards and COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Chemical	**Cancer Risk**	**Noncancer Hazard**	**Chemicals Contributing to Risk and Hazard (COCs)**
PARCEL G			
Current and Future Trespasser			
Surface Soil (Not located in soil source area)	—	—	—
Future Construction Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater (No COPCs identified)	—	—	—
Future Industrial Worker			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater (No COPCs identified)	—	—	—
Future Resident Adult			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater (No COPCs identified)	—	—	—
Future Resident Child			
Surface Soil (Not located in soil source area)	—	—	—
Subsurface Soil (Not located in soil source area)	—	—	—
Groundwater (No COPCs identified)	—	—	—
PARCEL H (1)			
Current and Future Resident Adult			
Groundwater	1.E-06	0.3	—
Total	1.E-06	0.3	
Current and Future Resident Child			
Groundwater	NA	0.3	—
Total	NA	0.3	

Notes:

(1) A residence currently exists on Parcel H, immediately east of Parcel D. The residence on Parcel H is within 100 feet of the VOC plume beneath Parcel D; therefore, it was evaluated for vapor intrusion using groundwater data identified in the core of the plume at Parcel D (Locations OMS-28-GW46-16, -GW64-16, and -GW75-29). Exposure and risk for a future resident on Parcel H were assumed to be the same as under current conditions. There is no current resident on Parcel D.

(2) The current industrial worker was not quantitatively evaluated at Parcel E; no chemicals of potential concern were identified in surface soil and no groundwater plume is within 100 feet of the building currently used by industrial workers.

(3) Not identified as a final chemical of concern. See Section 3.6 of the text.

A current construction worker is not evaluated for any parcel.
cis-1,2-DCE - cis-1,2-dichloroethene
COC - chemical of concern
NA - not applicable
PCE - tetrachloroethene
TCE - trichloroethene
trans-1,2-DCE - trans-1,2-dichloroethene
VC - vinyl chloride

Table 19
Site Concentrations and Site-Specific Screening Levels for COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel/Receptor/Pathway/COC [1]	Site Concentration [2]	Units	Carcinogenic SSSLs Based on the Following Risk Levels [3]			Noncarcinogenic SSSLs Based on the Following Hazard Quotients [3]			MCL [4]
			10^{-6}	10^{-5}	10^{-4}	0.1	1	3	
PARCEL A									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Surface Soil (Ingestion, Inhalation)									
Tetrachloroethene	329	mg/kg	572	5720	57200	**8.4**	**84.4**	**253**	NA
Groundwater (Ingestion, Dermal, Inhalation)									
Tetrachloroethene	12,235	ug/L	**172**	**1716**	17157	**2.7**	**27**	**80**	**5**
Trichloroethene	18	ug/L	**10.1**	101	1006	**0.13**	**1.3**	**3.9**	**5**
Future Industrial Worker									
Surface Soil (Ingestion, Inhalation)									
Tetrachloroethene	329	mg/kg	**126**	1260	12600	**47.2**	472	1416	NA
Groundwater (Ingestion, Dermal, Inhalation)									
Tetrachloroethene	12,235	ug/L	**72.7**	**727**	**7275**	**32.7**	**327**	**982**	**5**
Trichloroethene	18	ug/L	**3.5**	35	349	**2.9**	29	85.9	**5**
Groundwater (Vapor Intrusion)									
Tetrachloroethene	13,751	ug/L	**2127**	21265	212651	**790**	**7898**	23695	NA
Future Resident Adult [9]									
Surface Soil (Ingestion, Inhalation)									
Tetrachloroethene	329	mg/kg	**27.6**	**276**	2760	**11.4**	**114**	342	NA
Groundwater (Ingestion, Dermal, Inhalation)									
Tetrachloroethene	12235	ug/L	**5.7**	**57**	**565**	**2.5**	**25**	**75**	**5**
Trichloroethene	18	ug/L	**0.25**	**2.5**	25	**0.16**	**1.6**	**4.8**	**5**
Groundwater (Vapor Intrusion)									
Tetrachloroethene	13,751	ug/L	**61.4**	**614**	**6140**	**23.7**	**237**	**712**	NA
Trichloroethene [5]	19.84	ug/L	**3.6**	36	355	NC	NC	NC	NA
Future Resident Child									
Surface Soil (Ingestion, Inhalation)									
Tetrachloroethene	329	mg/kg	—	—	—	**9.3**	**93**	**280**	NA
Groundwater (Ingestion, Dermal)									
Tetrachloroethene	12,235	ug/L	—	—	—	**3.9**	**39**	**118**	**5**
Trichloroethene	18	ug/L	—	—	—	**0.4**	**4.4**	**13**	**5**
Groundwater (Vapor Intrusion)									
Tetrachloroethene [6]	13,751	ug/L	**61.4**	**614**	**6140**	**23.7**	**237**	**712**	NA
Trichloroethene [5, 6]	19.84	ug/L	**3.6**	36	355	NC	NC	NC	NA

Table 19
Site Concentrations and Site-Specific Screening Levels for COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel/Receptor/Pathway/COC [1]	Site Concentration [2]	Units	Carcinogenic SSSLs Based on the Following Risk Levels [3]			Noncarcinogenic SSSLs Based on the Following Hazard Quotients [3]			MCL [4]
			10^{-6}	10^{-5}	10^{-4}	0.1	1	3	
PARCEL B									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	10	ug/L	20.1	201	2012	**0.26**	**2.6**	**7.9**	**5**
Future Industrial Worker									
No COCs Identified									
Future Resident Adult [9]									
No COCs Identified									
Future Resident Child									
No COCs Identified									
PARCEL C									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	4	ug/L	20.1	201	2012	**0.26**	**2.6**	7.9	5
Future Industrial Worker									
No COCs Identified									
Future Resident Adult [9]									
No COCs Identified									
Future Resident Child									
No COCs Identified									
PARCEL D									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	20	ug/L	20.1	201	2012	**0.26**	**2.6**	**7.9**	**5**
Future Industrial Worker									
No COCs Identified									
Future Resident Adult [9]									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	20	ug/L	**0.5**	**5**	49.4	**0.32**	**3.2**	**9.7**	**5**
Groundwater (Vapor Intrusion)									
Trichloroethene [5]	9.02	ug/L	**7.1**	71	710	NC	NC	NC	NA
Future Resident Child									
Groundwater (Ingestion, Dermal)									
Trichloroethene	20	ug/L	—	—	—	**0.87**	**8.7**	26.1	**5**
Groundwater (Vapor Intrusion)									
Trichloroethene [5, 6]	9.02	ug/L	**7.1**	71	710	NC	NC	NC	NA

Table 19
Site Concentrations and Site-Specific Screening Levels for COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel/Receptor/Pathway/COC [1]	Site Concentration [2]	Units	Carcinogenic SSSLs Based on the Following Risk Levels [3]			Noncarcinogenic SSSLs Based on the Following Hazard Quotients [3]			MCL [4]
			10^{-6}	10^{-5}	10^{-4}	0.1	1	3	
PARCEL E									
Current Industrial Worker									
No COCs Identified [7]									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	145	ug/L	**20.1**	201	2012	**0.26**	**2.6**	**7.9**	**5**
Future Industrial Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	145	ug/L	**7**	**70**	697	**5.73**	**57**	172	**5**
Groundwater (Vapor Intrusion)									
Trichloroethene [5]	230.4	ug/L	**220**	2204	22044	NC	NC	NC	NA
Future Resident Adult [9]									
Groundwater (Ingestion, Dermal, Inhalation)									
Trichloroethene	145	ug/L	**0.25**	**2.5**	**25**	**0.16**	**1.6**	**5**	**5**
Vinyl Chloride	0.03	ug/L	**0.0094**	0.094	0.94	3	30	90	2
Groundwater (Vapor Intrusion)									
Trichloroethene [5]	230.4	ug/L	**6.83**	**68.3**	683	NC	NC	NC	NA
Future Resident Child									
Groundwater (Ingestion, Dermal)									
Trichloroethene	145	ug/L	—	—	—	**0.87**	**8.7**	**26**	**5**
Groundwater (Vapor Intrusion)									
Trichloroethene [5, 6]	230.4	ug/L	**6.83**	**68.3**	683	NC	NC	NC	NA

Table 19
Site Concentrations and Site-Specific Screening Levels for COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel/Receptor/Pathway/COC [1]	Site Concentration [2]	Units	Carcinogenic SSSLs Based on the Following Risk Levels [3]			Noncarcinogenic SSSLs Based on the Following Hazard Quotients [3]			MCL [4]
			10^{-6}	10^{-5}	10^{-4}	0.1	1	3	
PARCEL F									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Tetrachloroethene	190.1	ug/L	**172**	1716	17157	**2.67**	**27**	**80**	**5**
Trichloroethene	189.3	ug/L	**10.1**	**101**	1006	**0.13**	**1.3**	**3.9**	**5**
Future Industrial Worker									
Groundwater (Ingestion, Dermal, Inhalation)									
Tetrachloroethene	190.1	ug/L	**73**	727	7275	**32.7**	327	982	**5**
Trichloroethene	189.3	ug/L	**3.5**	**35**	349	**2.9**	**29**	**86**	**5**
Groundwater (Vapor Intrusion)									
Trichloroethene [5]	247.3	ug/L	**216**	2158	21576	NC	NC	NC	NA
Future Resident Adult [9]									
Groundwater (Ingestion, Dermal, Inhalation)									
cis-1,2-Dichloroethene	89.93	ug/L	**—**	**—**	**—**	**1.49**	**14.9**	**45**	**70**
Tetrachloroethene	190.1	ug/L	**3.8**	**38**	377	**1.26**	**12.6**	**38**	**5**
Trichloroethene	189.3	ug/L	**0.16**	**1.6**	**16**	**0.081**	**0.81**	**2.4**	**5**
Vinyl chloride	0.2	ug/L	**0.0063**	**0.063**	0.63	1.49	14.9	45	2
Groundwater (Vapor Intrusion)									
Tetrachloroethene	251.1	ug/L	**57.9**	579	5786	**22.3**	**223**	670	NA
Trichloroethene [5]	247.3	ug/L	**3.35**	**33.5**	335	NC	NC	NC	NA
Future Resident Child									
Groundwater (Ingestion, Dermal)									
cis-1,2-Dichloroethene	89.93	ug/L	—	—	—	**1.2**	**12**	**36**	**70**
Tetrachloroethene	190.1	ug/L	—	—	—	**2.6**	**26**	**78**	**5**
Trichloroethene	189.3	ug/L	—	—	—	**0.29**	**2.9**	**9**	**5**
Groundwater (Vapor Intrusion)									
Tetrachloroethene [6]	251.1	ug/L	57.9	579	5786	**22.3**	**223**	670	NA
Trichloroethene [5, 6]	247.3	ug/L	**3.35**	**33.5**	335	NC	NC	NC	NA

Table 19
Site Concentrations and Site-Specific Screening Levels for COCs
Alabama Army National Guard OMS #28
Mobile, Alabama

Parcel/Receptor/Pathway/COC (1)	Site Concentration (2)	Units	Carcinogenic SSSLs Based on the Following Risk Levels (3)			Noncarcinogenic SSSLs Based on the Following Hazard Quotients (3)			MCL (4)
			10^{-6}	10^{-5}	10^{-4}	0.1	1	3	
PARCEL G									
Current and Future Trespasser									
No COCs Identified									
Future Construction Worker									
No COCs Identified									
Future Industrial Worker									
No COCs Identified									
Future Resident Adult (9)									
No COCs Identified									
Future Resident Child									
No COCs Identified									
PARCEL H									
Current and Future Resident Adult (8, 9)									
No COCs Identified									
Current and Future Resident Child (8)									
No COCs Identified									

Notes:

(1) COCs were identified as those chemicals with a significant contribution to a pathway in a use scenario for a receptor that either (a) exceeds a 1 x 10^{-4} cumulative site cancer risk or (b) exceeds a non-carcinogenic HI of 1. No Subsurface Soil COCs were identified. See Risk and Hazard tables in Appendix E.

(2) Site concentration is the exposure point concentration shown in Tables 6 through 9.

(3) SSSLs were derived as follows:

For exposure to soil for the Construction Worker and Industrial Worker, and for exposure to soil and groundwater for the Resident Adult, SSSLs were calculated using USEPA's RSL Calculator (output included in Appendix G).

For exposure to soil for the Resident Child and for exposure to groundwater for the Construction Worker, Industrial Worker, and Resident Child, SSSLs were calculated using standard risk equations (shown in Appendix G).

For exposure to groundwater via vapor intrusion for the Industrial Worker, Resident Adult, and Resident Child — SSSLs were identified as the "target groundwater concentration" calculated by the Johnson and Ettinger Model (output included in Appendices F.2, F.3, and F.4).

(4) MCL is from the Drinking Water Standards and Health Advisories Tables (USEPA, November 2018). NA indicates an MCL is not applicable for this medium.

(5) The Johnson and Ettinger Model does not display noncarcinogenic SSSLs for this COC. Carcinogenic SSSLs are shown for the child receptor.

(6) While the Johnson and Ettinger Model calculated carcinogenic SSSLs for this COC, risk is not identified for a child receptor in risk evaluations.

(7) The current industrial worker was not quantitatively evaluated at Parcel E; no chemicals of potential concern were identified in surface soil and no groundwater plume is within 100 feet of the building currently used by industrial workers.

(8) A residence currently exists on Parcel H, immediately east of Parcel D. The residence on Parcel H is within 100 feet of the VOC plume beneath Parcel D; therefore, it was evaluated for vapor intrusion using groundwater data identified in the core of the plume at Parcel D (Locations OMS-28-GW46-16, -GW64-16, and -GW75-29). Exposure and risk for a future resident on Parcel H were assumed to be the same as under current conditions. There is no current resident on Parcel D.

(9) RSL Calculator output for the Resident Adult consists of only the adult values; it does not include the child values.

When more than one COC was identified for a given receptor's pathway, the SSSL for each COC was divided by the number of COCs for that receptor's pathway (Section 6.7.2 of ADEM, February 2017).

COCs in bold indicate the site concentration exceeds one or more SSSLs or the MCL. The SSSLs and MCL exceeded are also bolded.

A current construction worker is not evaluated for any parcel.

COC - chemical of concern
MCL - maximum contaminant level
mg/kg - milligrams per kilogram (parts per million)
NC - not calculated
SSSL - site-specific screening level
ug/L - micrograms per liter (parts per billion)

Sources:

ADEM, February 2017. Alabama Risk-Based Corrective Action Guidance Manual, Revision 3.0.

USEPA, November 2021. Regional Screening Levels (RSLs) Summary Table

Table 20
Identification of Preliminary COPECs in Surface Soil
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Chemical	Frequency of Detection	Units	Minimum Detection Limit	Maximum Detection Limit	Minimum Concentration (Qualifier)	Maximum Concentration (Qualifier)	Maximum Concentration Sample Designation	EPA Region 4 Ecological Screening Value (1)	Maximum Hazard Quotient (HQ) (2)	Preliminary COPEC (Yes/No) / Basis (3)	
2-Butanone	1 / 3	mg/kg	0.000395	3.07	0.0043 J/J	0.0043 J/J	OMS-28-SB14-1	1	0.004	No	C
4-Methyl-2-pentanone	1 / 3	mg/kg	0.000197	1.54	0.00139 J/J	0.00139 J/J	OMS-28-SB14-1	0.36	0.004	No	C
Acetone	2 / 3	mg/kg	0.000395	3.07	0.00437 J/J	0.083	OMS-28-SB14-1	1.2	0.07	No	C
Benzene	1 / 3	mg/kg	0.000197	1.54	0.000499 J/J	0.000499 J/J	OMS-28-SB04-1	0.12	0.004	No	C
Cyclohexane	1 / 3	mg/kg	0.000197	1.54	0.000698 J/J	0.000698 J/J	OMS-28-SB04-1	0.007	0.1	No	C
Methylcyclohexane	1 / 3	mg/kg	0.000197	1.54	0.00143 J/J	0.00143 J/J	OMS-28-SB04-1	0.007	0.2	No	C
Methylene chloride	2 / 3	mg/kg	0.00079	6.14	0.00192 J/J	0.00314 J/J	OMS-28-SB04-1	0.21	0.01	No	C
Tetrachloroethene	**9 / 31**	**mg/kg**	**0.000395**	**3.07**	**0.0011587 J/J**	**329**	**OMS-28-SB24-1**	**0.06**	**5483**	**Yes**	**F**
Toluene	1 / 3	mg/kg	0.000197	1.54	0.00137 J/J	0.00137 J/J	OMS-28-SB04-1	0.15	0.009	No	C
Trichloroethene	3 / 31	mg/kg	0.0006	1.54	0.0034442 /J	0.0137143 /J	OMS-28-SB29-1	0.06	0.2	No	C
Xylenes (total)	1 / 3	mg/kg	0.000395	3.07	0.000862 J/J	0.000862 J/J	OMS-28-SB04-1	0.1	0.009	No	C

Notes:

(1) Screening value is the Soil Ecological Screening Value (ESV) from Region 4 Ecological Risk Assessment Supplemental Guidance (USEPA, March 2018).
Note: The ESV for 2-hexanone was used as a surrogate for 4-methyl-2-pentanone.
The ESV for hexane was used as a surrogate for cyclohexane and methylcyclohexane.
(2) Maximum HQ = maximum concentration/ESV. For non-detects, one-half the maximum detection limit is used for the concentration.
(3) Basis for Identification as a Preliminary COPEC:
Not Identified as a Preliminary COPEC
A - One-half the maximum detection limit is less than ESV for a chemical not detected in any sample.
B - Chemical lacks an ESV and was not detected in any sample.
C - Maximum detected concentration is less than ESV.
D - Chemical is a member of a class of compounds and the total concentration is screened against an ESV for the total compounds in that class.
Identified as a Preliminary COPEC
E - One-half the maximum detection limit equals or exceeds the ESV for a chemical not detected in any sample.
F - Maximum detected concentration equals or exceeds the ESV.
G - Chemical was detected and no ESV was available.
Bold font indicates selection as a Preliminary COPEC.

Definitions:
ESV - Ecological Screening Value
NC - Not calculated
NSV - No screening value is available

Table 21
Refinement Screening for Birds and Mammals (Surface Soil)
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

Detected Preliminary COPEC [1]	Maximum Concentration	95% UCL Concentration [2]	Units	Frequency of Detection	Background Screening Value (BSV) [3]	Frequency Exceeding BSV	Refinement Screening Value (RSV) [4]	RSV (Source) [4]	Hazard Quotients (HQs) [5]				Retained as a Refined COPEC?	Reason for COPEC Selection or Deletion [6]
									Max HQ	Max HQ > 1?	95% UCL HQ	95% UCL HQ > 1		
SVOCs														
Tetrachloroethene	329	--	mg/kg	9 / 31	--	--	0.18	(a)	1,828	Yes	--	--	Yes	ARSV [7]

Notes:

(1) Detected preliminary COPECs identified on Table 20. Chemicals in **bold** initially identified as refined COPECs.

(2) The 95% UCL concentration (572 mg/kg) and its distribution are shown in HHRA Table 6. Because the 95% UCL is higher than the maximum detected concentration, the maximum was used as the exposure point concentration. (The arithmetic mean concentration of PCE in Parcel A surface soil is 54 mg/kg.)

(3) Background value is not available.

(4) RSV is the lower of the Avian and Mammalian values from Table 3 in USEPA 2018 (Region 4 Ecological Risk Assessment Supplemental Guidance, March 2018 Update). There is no avian RSV for PCE; the mammalian RSV is from the following original source:

(a) Los Alamos National Laboratory (LANL) 2017. ECORISK Database Release 4.1. September. http://www.lanl.gov/environment/protection/eco-risk-assessment.php

(5) Max HQ or 95% UCL HQ = Maximum or 95% UCL concentration / RSV.

(6) Reasons for COPEC Selection or Deletion:

ARSV = Above refinement screening value: 95% UCL HQ ≥ 1 and maximum concentration > the background value (if available).

BRSV = Below refinement screening value: 95% UCL HQ (or if not available, Max HQ) < 1.

EN = Essential nutrient: naturally occurring element very low in toxicity, and concentrations not highly elevated.

IFD = Infrequently detected: frequency of detection <5%, not detected in other media or at high concentrations, and not expected to occur.

(7) All five samples with exceedances of the RSV were located in Parcel A.

-- = Not available or not applicable

95% UCL = 95 percent upper confidence limit on the mean

COPEC = chemical of potential ecological concern

Table 22
Exposure Dose Calculation for the Shrew
Dose-Based Refinement -- Soil and Food-Chain Pathways
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

Refined COPECs in Soil (1)	Soil Concentration (mg/kg) (2)		BAF_{inv} (unitless) (3)	Intake from Invertebrate Ingestion (mg/day) (4)		Intake from Soil Ingestion (mg/day) (4)		Exposure Dose from Soil (mg/kg BW/day) (4)	
	Maximum	95% UCL		Maximum	95% UCL	Maximum	95% UCL	Maximum	95% UCL
Tetrachloroethene	329	--	4.6	1.51E+01	--	2.96E-02	--	3.30E+01	--

Notes:
(1) Refined COPEC in surface soil was identified on Table 21.
(2) Concentrations from Table 21. The 95% UCL is higher than the maximum; therefore, it is not used.
(3) Basis for BAF_{inv} (bioaccumulation factor from soil to invertebrates) is provided in Table 23.
(4) Exposure Dose Calculation: EDsoil = [(intake from invertebrate ingestion) + (intake from incidental soil ingestion)] x area foraging factor/body weight.
$ED_{soil} = [(C_{soil} \times BAF_{inv} \times IR_f \times F_{inv}) + (C_{soil} \times IR_{soil})] \times AFF/BW$
where:
ED_{soil} = Exposure dose from preliminary COPECs in soil (mg/kg BW/day).
C_{soil} = Concentration in soil (mg/kg).
BAF_{inv} = Bioaccumulation factor from soil to invertebrates (unitless).
IR_f = Ingestion rate of food (kg/day) = 0.01. See Table 24 for basis/source.
F_{inv} = Fraction of diet that is invertebrates = 1. See Table 24 for basis/source.
IR_{soil} = Ingestion rate of soil (kg/day) = 0.00009. See Table 24 for basis/source.
AFF = Area foraging factor (unitless) = 0.037. Calculated as exposure area/home range = 0.037/1 = 0.037. AFF cannot exceed 1. Exposure area = approx. 0.037 acre. Shrew home range = 1 acre. See Table 24 for basis/source of home range.
BW = body weight (kg) = 0.017. See Table 24 for basis/source.

-- = Not applicable

Table 23
Ecological Transfer Factors
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

Chemical	Log Kow (unitless)	Source	BAF_{inv} (unitless)	Source
VOCs				
Tetrachloroethene	3.4	A	4.6	B

Notes:
BAF_{inv} = Bioaccumulation factor from soil to invertebrate (wet-weight basis).
Kow = Octanol-water partition coefficient.

Sources:
A - Log Kow from ORNL/UT (2022)
B - BAF_{inv} values are based on the soil-to-earthworm BAF and Kow regression from USEPA (2003):
BAF_{inv} = [10^(logKow-0.6)]/[foc x 10^(0.983logKow + 0.00028)], foc (fraction of organic carbon) is conservatively set to 1% (0.01).
The BAF was multiplied by 0.16 (earthworm water content is 84% [USEPA, 2003]) to convert the BAF to a wet-weight basis.

References:

Oak Ridge National Laboratory and University of Tennessee (ORNL/UT), 2022. *The Risk Assessment Information System* (RAIS). Accessed February 2022 at http://rais.ornl.gov/.
USEPA, 2003. Attachment 4-1, Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs), Exposure Factors and Bioaccumulation Models for Derivation of Wildlife Eco-SSL. OSWER Directive 92857-55.

Table 24
Exposure Factors for Mammalian Receptor
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

Receptor/ Exposure Factor		Estimated Value	Units	Basis	Source
Southern short-tailed shrew (*Blarina carolinensis*)					
Body Weight (BW)		0.017	kg	Mean of BWs (wet weight) for males and females of the short-tailed shrew (*Blarina brevicauda*) from two studies.	USEPA (1993)
Dietary Composition:					
	Invertebrates	100	%	Based on shrew's dietary composition of predominantly earthworms, insects, and other invertebrates. Earthworms are conservatively assumed to compose 100% of the diet.	USEPA (1993)
Ingestion Rate of Invertebrates (IR_{inv})		0.01	kg/day	Estimated based on assumption of same rate per BW as a short-tailed shrew. Food ingestion rate of short-tailed shrew = 0.62 kg food/kg BW-day (wet wt basis). 0.62 kg food/kg BW/day x 0.017 kg BW = 0.01 kg food/day (wet wt)	USEPA (1993), USEPA (2019)
Ingestion Rate of Soil (IR_{soil})		0.00009	kg/day	To convert food ingestion rate to a dry weight basis for this calculation: 0.01 kg wet food/day x 0.25 (estimated water content of terrestrial invertebrates in diet is approx. 75%) = 0.0025 kg food/day (dry wt basis). Ingestion rate of food (0.0025 kg/day dry wt) x soil ingestion rate of 3.7% of diet (dry wt) = 0.00009 kg/day (dry-wt basis).	USEPA (1993), USEPA (2019)
Home Range		1	acre	Mean home range of the short-tailed shrew for both sexes, all seasons, from a study in a bog in southern Manitoba.	USEPA (1993), USEPA (2019)

Notes:
BW = body weight (wet weight)

References:
U.S. Environmental Protection Agency (USEPA), 1993. Wildlife Exposure Factors Handbook. Office of Research and Development, Washington, DC. EPA/600/R-93/187.
U.S. Environmental Protection Agency (USEPA), 2019. EPA Region 4 Preferred Parameters to be used in Ecological Risk Assessments in Region 4 - Version 10. Draft. Last revised June 18, 2019.

Table 25
Mammalian Toxicity Reference Values
Dose-Based Refinement -- Food Chain Pathways
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

COPEC	Endpoint Type	TRV (mg/kg/d)	Basis of TRV	Source
VOCs				
Tetrachloroethene	NOAEL	1.4	Mouse study, 6-week duration, seven dose levels administered by oral gavage, effect hepatotoxicity	A
	LOAEL	7	Mouse study, 6-week duration, seven dose levels administered by oral gavage, effect hepatotoxicity	A

Notes:
NOAEL = no-observed-adverse-effects level
LOAEL = lowest-observed-adverse-effects level
TRV = toxicity reference value

Sources:
(A) Sample, B.E., D.M. Opresko, and G.W. Suter, II, 1996. *Toxicological Benchmarks for Wildlife: 1996 Revision* . ES/ER/TM-86/R3. Oak Ridge National Laboratory, Oak Ridge, TN.

Table 26
Risk Calculation for the Shrew
Dose-Based Refinement -- Soil and Food Chain Pathways
Ecological Risk Assessment
Alabama Army National Guard OMS #28
Mobile, Alabama

Refined COPEC (1)	Exposure Dose (mg/kg BW/day) (2)		Conservative TRV (NOAEL)(3) (mg/kg BW/day)	Conservative HQ (4)	Alternative TRV (LOAEL)(5) (mg/kg BW/day)	Alternative HQ (4)
	Maximum	95% UCL		Max/NOAEL		Max/LOAEL
Tetrachloroethene	33	--	1.4	24	7	**4.7**

Notes:

Chemical names in **bold** are those identified as final COPECs. Alternative HQs in bold exceed 1.

(1) Refined COPEC in soil was identified on Table 21.

(2) Exposure dose from Table 22.

(3) Conservative TRVs are based on NOAELs (no-observed-adverse-effect levels) from Table 25.

(4) HQ (hazard quotient) = exposure dose / TRV.

(5) Alternative TRVs are based on LOAELs (lowest-observed-adverse-effect levels) from Table 25.

BW = body weight

COPEC = chemical of potential ecological concern

HQ = hazard quotient

TRV = toxicity reference value

FIGURES

Vicinity Map

Legend

- County
- Waterbodies

0 300 600 1,200 Feet

1 inch = 600 feet

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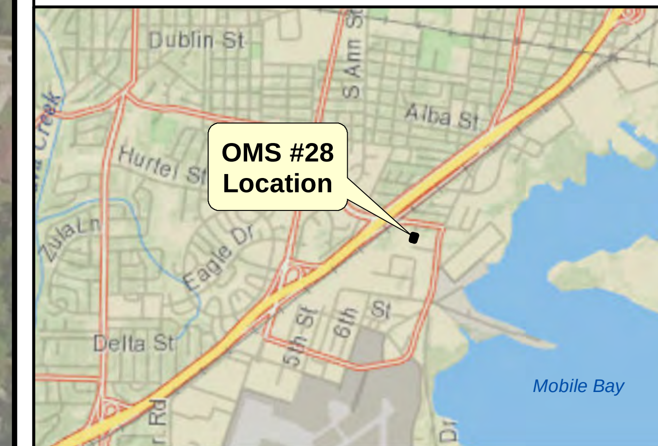
Facility Location Map

Army National Guard OMS #28
Mobile, Alabama

PROJECT NO.	DRAWN BY:	DATE:	
60439687	TEG	8/27/2018	Figure 1

Document Path: L:\Projects\60439687 Brookley\900-CADD-GIS\Brookley_GIS\Maps\TCollins\Figure 1_Facility Location Map.mxd

Site Location



Legend

- Railroad
- Approximate Ditch Orientation
- Approximate Ditch Orientation Flow Direction
- Fenceline
- Parcel Boundary

Note:
Wells MW-10 and MW-11 were abandoned in 2008 at the property owner's request and have not been replaced.

0 75 150 300 Feet

1 inch = 150 feet

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Facility Site Location Map

Army National Guard OMS #28
Mobile, Alabama

PROJECT NO.	DRAWN BY:	DATE:	
60439687	TEG	8/27/2018	**Figure 2**

Site Location

Legend

- Shallow Monitoring Well Location
- Deep Monitoring Well Location
- Groundwater Sample Location
- Soil Boring Location
- Fenceline
- Railroad
- Parcel Boundary
- Parcel Designation (A - H)

Note:
- Some locations were sampled on multiple dates and at multiple depths.
- Table 1 contains a list of locations, depths, and dates sampled.

0 40 80 160 Feet

1 inch = 80 feet

N E S W

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Sample Locations

Army National Guard OMS #28
Mobile, Alabama

PROJECT NO.	DRAWN BY:	DATE:	
60439687	TEG	12/12/2018	Figure 3

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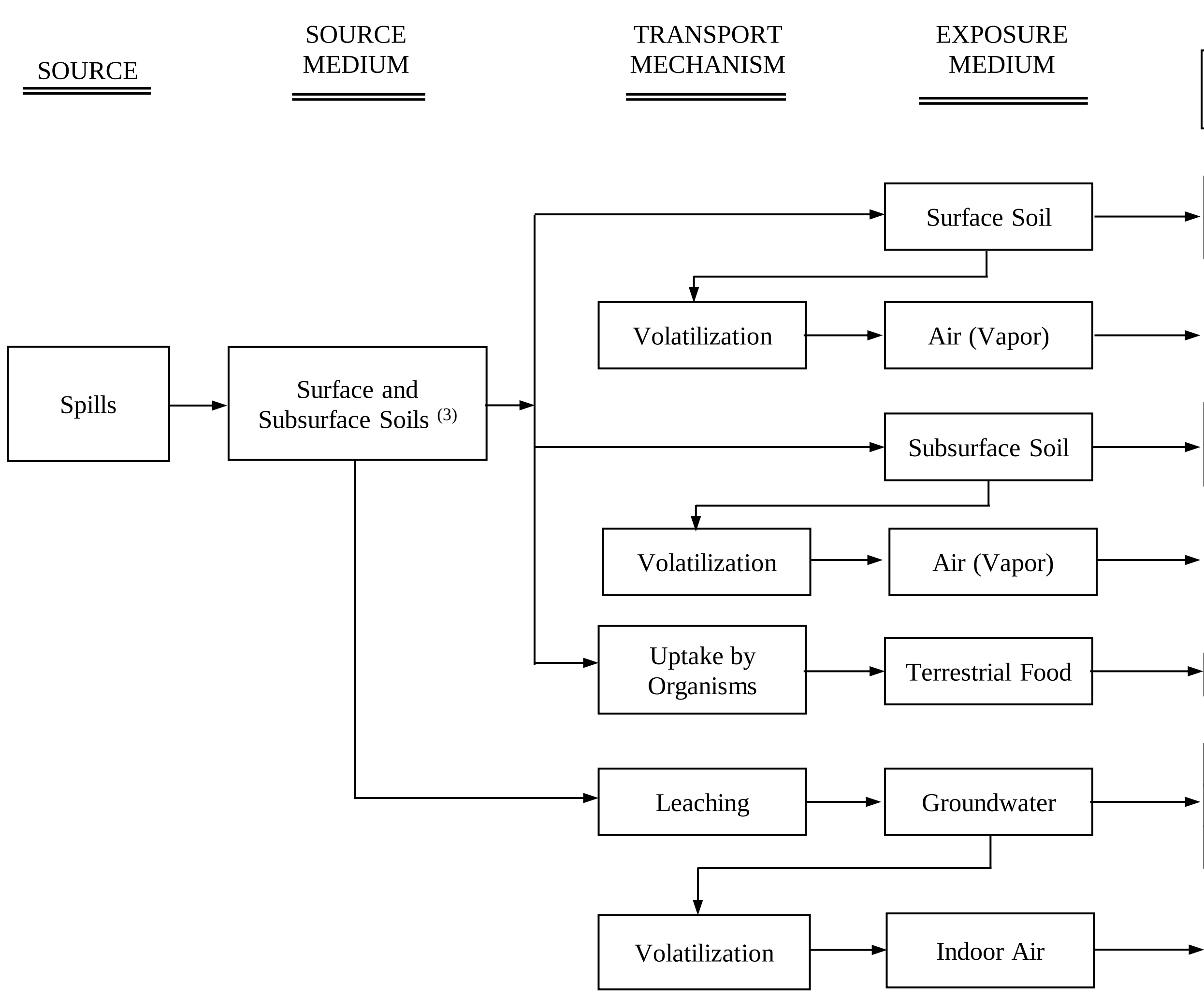


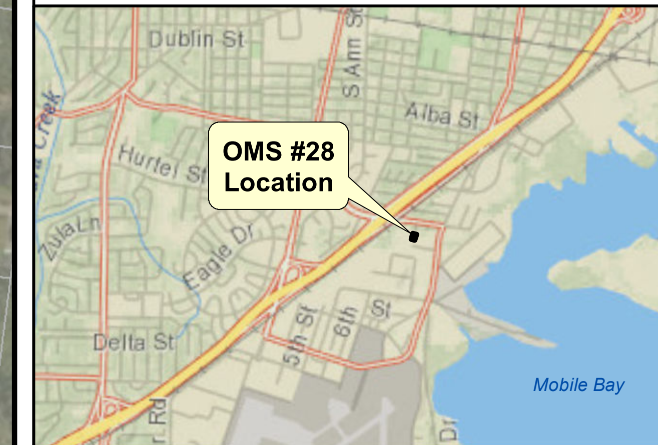
	HUMAN RECEPTORS							ECOLOGICAL RECEPTORS
	CURRENT			FUTURE				CURRENT / FUTURE
EXPOSURE ROUTE	TRESPASSER	INDUSTRIAL WORKER [1]	RESIDENT [2]	TRESPASSER	INDUSTRIAL WORKER	RESIDENT	CONSTRUCTION WORKER	TERRESTRIAL
Ingestion	X	X		X	X	X	X	X
Dermal	X	X		X	X	X	X	*
Inhalation	X	X		X	X	X	X	*
Ingestion					X	X	X	*
Dermal					X	X	X	*
Inhalation							X	*
Ingestion								*
Ingestion					X	X	X	
Dermal					X	X	X	
Inhalation						X	X	
Inhalation			X		X	X		

LEGEND

(1) = A current industrial worker will be evaluated only at Parcel E.
(2) = A current resident will be evaluated only at Parcel H, an off-site parcel adjacent to Parcel D.
(3)= Soil samples were collected only from Parcels A, E, and F. Therefore, receptors will not be evaluated for surface or subsurface soil at Parcels B, C, D, or G.
X = Potentially complete exposure pathway to be quantitatively evaluated.
* = Pathway potentially complete but insignificant and not quantitatively evaluated.
Blank cell = Incomplete exposure pathway.

Figure 4
Exposure Pathway Diagram
Alabama Army National Guard OMS #28
Mobile, Alabama

Site Location



Legend

- Surficial Monitoring Well Locations
- Discrete Groundwater Sample Locations
- Approximate Extent of PCE and TCE Exceedance of the MCL (5 µg/L) in the Lower Surficial
- Approximate Extent of PCE and TCE Exceedance of the MCL (5 µg/L) in the Upper/Middle Surficial
- Apparent Groundwater Flow Direction - May 2017
- Fenceline
- Railroad
- Approximate Ditch Orientation
- Approximate Ditch Orientation Flow Direction
- Parcel Boundary
- Elevated groundwater concentration within the core of the parcel-specific plume

Locations incude:

Parcel A	Parcel E
GW19	GW32
GW22	GW85
GW23	GW86
GW24	GW87
GW39	
GW40	**Parcel F**
	OMS-28-5
Parcel B	GW18
GW43	GW20
	GW21
Parcel C	GW51
GW44	
Parcel D	
GW46	
GW64	
GW75	

0 40 80 160 Feet

1 inch = 80 feet

AECOM

10 Patewood Drive, Building 6, Suite 500
Greenville, SC 29615
T: (864) 234-3000 F: (864)234-3069

Groundwater Locations Identified Within the Core of the VOC Plume at Each Parcel

Army National Guard OMS #28
Mobile, Alabama

PROJECT NO.	DRAWN BY:	DATE:	
60439687	TEG	3/5/2019	**Figure 5**

Document Path: L:\Projects\60439687 Brookley\900-CADD-GIS\Brookley_GIS\Maps\TCollins\Figure 5_OMS_GW Locations Within VOC Plume.mxd

APPENDICES

APPENDIX A

VISL CALCULATOR OUTPUT

(Provided on CD)

Table A-1
VISL Calculator Commercial (HQ=0.1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Commercial Vapor Intrusion Screening Levels (VISL)

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; U = user provided; G = see RSL User's Guide Section 5; CA = cancer; NC = noncancer.

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) ($\mu g/m^3$)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target ($\mu g/m^3$)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target ($\mu g/L$)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (21 ℃) ($\mu g/m^3$)	Maximum Groundwater Vapor Concentration C_{hc} ($\mu g/m^3$)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$($\mu g/m^3$)	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$($\mu g/m^3$)
Acenaphthene	83-32-9	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		1.78E+04	2.05E+04	2.10E+01	8.00E-01	U	-		-		No	-	-
Acetone	67-64-1	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		7.25E+08	1.22E+09	2.10E+01	2.50E+00	U	-		-		No	-	-
Carbon Disulfide	75-15-0	Yes	Yes	Yes	Yes	3.07E+02	NC	1.02E+04	5.98E+02	--	1.47E+09	1.11E+09	2.10E+01	1.30E+00	U	-		7.00E-01	U	No	-	3.07E+02
Cumene	98-82-8	Yes	Yes	Yes	Yes	1.75E+02	NC	5.84E+03	4.89E+02	--	2.91E+07	2.20E+07	2.10E+01	9.00E-01	U	-		4.00E-01	U	No	-	1.75E+02
Dichloroethylene, 1,1-	75-35-4	Yes	Yes	Yes	Yes	8.76E+01	NC	2.92E+03	9.38E+01	No (7)	3.13E+09	2.26E+09	2.10E+01	6.50E+00	U	-		2.00E-01	U	No	-	8.76E+01
Dichloroethylene, cis-1,2-	156-59-2	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		1.04E+09	9.09E+08	2.10E+01	3.00E+00	U	-		-		No	-	-
Dichloroethylene, trans-1,2-	156-60-5	Yes	Yes	Yes	Yes	1.75E+01	NC	5.84E+02	5.32E+01	Yes (100)	1.73E+09	1.49E+09	2.10E+01	6.00E+00	U	-		4.00E-02	U	No	-	1.75E+01
Methyl Ethyl Ketone (2-Butanone)	78-93-3	Yes	Yes	Yes	Yes	2.19E+03	NC	7.30E+04	1.12E+06	--	3.51E+08	4.35E+08	2.10E+01	1.40E+00	U	-		5.00E+00	U	No	-	2.19E+03
Methylene Chloride	75-09-2	Yes	Yes	Yes	Yes	2.63E+02	NC	8.76E+03	2.29E+03	No (5)	1.99E+09	1.49E+09	2.10E+01	1.30E+01	U	1.00E-08	U	6.00E-01	U	Mut	1.23E+03	2.63E+02
Tetrachloroethylene	127-18-4	Yes	Yes	Yes	Yes	1.75E+01	NC	5.84E+02	2.97E+01	No (5)	1.65E+08	1.22E+08	2.10E+01	-		2.60E-07	U	4.00E-02	U	No	4.72E+01	1.75E+01
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	8.76E-01	NC	2.92E+01	2.59E+00	Yes (5)	4.88E+08	4.32E+08	2.10E+01	8.00E+00	U	4.10E-06	U	2.00E-03	U	Mut	2.99E+00	8.76E-01
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	2.79E+00	CA	9.29E+01	2.69E+00	No (2)	1.00E+10	9.12E+09	2.10E+01	3.60E+00	U	4.40E-06	U	8.00E-02	U	Mut	2.79E+00	3.50E+01

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Table A-2
VISL Calculator Commercial (HQ=1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Commercial Vapor Intrusion Screening Levels (VISL)

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; U = user provided; G = see RSL User's Guide Section 5; CA = cancer; NC = noncancer.

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=1) MIN($C_{ia,c}$,$C_{ia,nc}$) (μg/m^3)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=1) C_{sg},Target (μg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) C_{gw},Target (μg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (21 °C) (μg/m^3)	Maximum Groundwater Vapor Concentration C_{hc} (μg/m^3)	Temperature for Maximum Groundwater Vapor Concentration (°C)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$(μg/m^3)	Noncarcinogenic VISL THQ=1 $C_{ia,nc}$(μg/m^3)
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	2.99E+00	CA	9.97E+01	8.86E+00	No (5)	4.88E+08	4.32E+08	2.10E+01	8.00E+00	U	4.10E-06	U	2.00E-03	U	Mut	2.99E+00	8.76E+00

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Table A-3
VISL Calculator Resident (HQ=0.1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Resident Vapor Intrusion Screening Levels (VISL)

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; U = user provided; G = see RSL User's Guide Section 5; CA = cancer; NC = noncancer.

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=0.1) MIN($C_{ia,c}$,$C_{ia,nc}$) (µg/m^3)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=0.1) C_{sg},Target (µg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=0.1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (21 ℃) (µg/m^3)	Maximum Groundwater Vapor Concentration C_{hc} (µg/m^3)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$(µg/m^3)	Noncarcinogenic VISL THQ=0.1 $C_{ia,nc}$(µg/m^3)
Acenaphthene	83-32-9	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		1.78E+04	2.05E+04	2.10E+01	8.00E-01	U	-		-		No	-	-
Acetone	67-64-1	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		7.25E+08	1.22E+09	2.10E+01	2.50E+00	U	-		-		No	-	-
Carbon Disulfide	75-15-0	Yes	Yes	Yes	Yes	7.30E+01	NC	2.43E+03	1.42E+02	--	1.47E+09	1.11E+09	2.10E+01	1.30E+00	U	-		7.00E-01	U	No	-	7.30E+01
Cumene	98-82-8	Yes	Yes	Yes	Yes	4.17E+01	NC	1.39E+03	1.16E+02	--	2.91E+07	2.20E+07	2.10E+01	9.00E-01	U	-		4.00E-01	U	No	-	4.17E+01
Dichloroethylene, 1,1-	75-35-4	Yes	Yes	Yes	Yes	2.09E+01	NC	6.95E+02	2.23E+01	No (7)	3.13E+09	2.26E+09	2.10E+01	6.50E+00	U	-		2.00E-01	U	No	-	2.09E+01
Dichloroethylene, cis-1,2-	156-59-2	Yes	No	No Inhal. Tox. Info	No Inhal. Tox. Info	-		-	-		1.04E+09	9.09E+08	2.10E+01	3.00E+00	U	-		-		No	-	-
Dichloroethylene, trans-1,2-	156-60-5	Yes	Yes	Yes	Yes	4.17E+00	NC	1.39E+02	1.27E+01	Yes (100)	1.73E+09	1.49E+09	2.10E+01	6.00E+00	U	-		4.00E-02	U	No	-	4.17E+00
Methyl Ethyl Ketone (2-Butanone)	78-93-3	Yes	Yes	Yes	Yes	5.21E+02	NC	1.74E+04	2.67E+05	--	3.51E+08	4.35E+08	2.10E+01	1.40E+00	U	-		5.00E+00	U	No	-	5.21E+02
Methylene Chloride	75-09-2	Yes	Yes	Yes	Yes	6.26E+01	NC	2.09E+03	5.45E+02	No (5)	1.99E+09	1.49E+09	2.10E+01	1.30E+01	U	1.00E-08	U	6.00E-01	U	Mut	1.01E+02	6.26E+01
Tetrachloroethylene	127-18-4	Yes	Yes	Yes	Yes	4.17E+00	NC	1.39E+02	7.06E+00	No (5)	1.65E+08	1.22E+08	2.10E+01	-		2.60E-07	U	4.00E-02	U	No	1.08E+01	4.17E+00
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	2.09E-01	NC	6.95E+00	6.18E-01	Yes (5)	4.88E+08	4.32E+08	2.10E+01	8.00E+00	U	4.10E-06	U	2.00E-03	U	Mut	4.78E-01	2.09E-01
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	1.68E-01	CA	5.59E+00	1.62E-01	Yes (2)	1.00E+10	9.12E+09	2.10E+01	3.60E+00	U	4.40E-06	U	8.00E-02	U	Mut	1.68E-01	8.34E+00

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Table A-4
VISL Calculator Resident (HQ=1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Resident Vapor Intrusion Screening Levels (VISL)

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; U = user provided; G = see RSL User's Guide Section 5; CA = cancer; NC = noncancer.

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=1) MIN($C_{ia,c}$,$C_{ia,nc}$) (µg/m^3)	Toxicity Basis	Target Sub-Slab and Near-source Soil Gas Concentration (TCR=1E-06 or THQ=1) C_{sg},Target (µg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (21 ℃) (µg/m^3)	Maximum Groundwater Vapor Concentration C_{hc} (µg/m^3)	Temperature for Maximum Groundwater Vapor Concentration (℃)	Lower Explosive Limit LEL (% by volume)	LEL Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfC (mg/m^3)	RfC Ref	Mutagenic Indicator	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$(µg/m^3)	Noncarcinogenic VISL THQ=1 $C_{ia,nc}$(µg/m^3)
Trichloroethylene	79-01-6	Yes	Yes	Yes	Yes	4.78E-01	CA	1.59E+01	1.42E+00	Yes (5)	4.88E+08	4.32E+08	2.10E+01	8.00E+00	U	4.10E-06	U	2.00E-03	U	Mut	4.78E-01	2.09E+00

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APPENDIX B

DEVELOPMENT OF DERMAL ABSORPTION EXPOSURE IN GROUNDWATER AND TRENCH MODEL

(Provided on CD)

Table B-1
DA_{event} Equations for Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*, then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	Definition (Units)	Value	Source
Organics			
DA_{event}	Dose absorbed per event (mg/cm^2-event)	Chemical-specific	Calculated using Equations 3.2 or 3.3 (USEPA, July 2004).
FA	Fraction absorbed water (dimensionless)	Chemical-specific	Obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).
K_p	Dermal permeability coefficient (cm/hr)	Chemical-specific	Obtained from Appendix B, Exhibit B-2 (USEPA, July 2004).
C_w	Chemical concentration in water (mg/cm^3)	Chemical-specific	Refer to Table 8 for groundwater concentrations.
τ_{event}	Lag time per event (hr/event)	Chemical-specific	Calculated using Equation A.4 (USEPA, July 2004).
t_{event}	Event duration (hr/event)	GW - Resident Adult: 0.71	Obtained from USEPA, April 2014.
		GW - Resident Child: 0.54	Obtained from USEPA, April 2014.
		GW - Age-Adjusted Resident Adult: 0.67	Age Adjusted, based on tevent of 0.54 for child and 0.71 for adult from USEPA 2014: ((0.54*6) + (0.71*20)) / 26
t^*	Time to reach steady-state (hr)	Chemical-specific	Calculated using Equations A.5 or A.6 (USEPA, July 2004).
B	Kp stratum corneum: Kp viable epidermis (dimensionless)	Chemical-specific	Calculated using Equation A.1 (USEPA, July 2004).

Table B-2
Estimation of DA_{event} - Lag Time per Event (τ_{event}) for Dermal Contact with Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

$$\tau_{event} = \frac{l_{sc}^{\,2}}{6 * D_{sc}} = 0.105 * 10^{(0.0056*MW)}$$

Used in calculation for t_{event} (Equation A.4 in USEPA 2004)	**Molecular Weight** [1] (g/mole)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**Apparent thickness of stratum corneum** (cm)	**Effective Diffusion Coefficient through Stratum Corneum** (cm2/hr)	**Lag Time per Event** (hr/event)
Chemical	MW	Log *Dsc/lsc*	*Dsc / lsc*	*lsc*	*Dsc*	τ_{event}
Groundwater						
Parcel A						
Tetrachloroethene	1.66E+02	-3.74E+00	1.83E-04	1.00E-03	1.83E-07	9.09E-01
Trichloroethylene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Parcel B						
Trichloroethylene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Parcel C						
Trichloroethylene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Parcel D						
Trichloroethylene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Parcel E						
cis-1,2-Dichloroethene	9.69E+01	-3.35E+00	4.48E-04	1.00E-03	4.48E-07	3.72E-01
Trichloroethylene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Vinyl Chloride	6.25E+01	-3.16E+00	6.99E-04	1.00E-03	6.99E-07	2.39E-01
Parcel F						
cis-1,2-Dichloroethene	9.69E+01	-3.35E+00	4.48E-04	1.00E-03	4.48E-07	3.72E-01
Tetrachloroethene	1.66E+02	-3.74E+00	1.83E-04	1.00E-03	1.83E-07	9.09E-01
trans-1,2-Dichloroethene	9.69E+01	-3.35E+00	4.48E-04	1.00E-03	4.48E-07	3.72E-01
Trichloroethene	1.31E+02	-3.54E+00	2.87E-04	1.00E-03	2.87E-07	5.81E-01
Vinyl Chloride	6.25E+01	-3.16E+00	6.99E-04	1.00E-03	6.99E-07	2.39E-01

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table B-3
Estimation of DA_{event} - Time to Reach Steady State for Dermal Contact with Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

If $B \leq 0.6$, then $t^* = 2.4 * \tau_{event}$

If $B > 0.6$, then $t^* = 6 * \tau_{event} (b - \sqrt{b^2 - c^2})$

$b = \frac{2 * (1 + B)^2}{\pi} - c$ $c = \frac{1 + 3B + 3B^2}{3 * (1 + B)}$

Used in calculation for t* (Equation A.5 or A.6 in USEPA 2004). Also uses Equations A.7 and A.8 for b and c in USEPA 2004.	**Permeability Constant [1]** (cm/hr)	**Molecular Weight [1]** (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis** (unitless)	**Lag Time per Event** (hr/event)	**Formula Used**	**Time to reach steady state** (hr)	**Correlation Coefficients** (unitless)	**Correlation Coefficients** (unitless)
Chemical	Kp	MW	B	τ_{event}	Formula	t*	b	c
Groundwater								
Parcel A								
Tetrachloroethene	3.34E-02	1.66E+02	1.66E-01	9.09E-01	Eq. A.5	2.18E+00	4.13E-01	4.52E-01
Trichloroethylene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Parcel B								
Trichloroethylene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Parcel C								
Trichloroethylene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Parcel D								
Trichloroethylene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Parcel E								
cis-1,2-Dichloroethene	1.10E-02	9.69E+01	4.17E-02	3.72E-01	Eq. A.5	8.94E-01	3.29E-01	3.62E-01
Trichloroethylene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Vinyl Chloride	8.38E-03	6.25E+01	2.55E-02	2.39E-01	Eq. A.5	5.73E-01	3.19E-01	3.51E-01
Parcel F								
cis-1,2-Dichloroethene	1.10E-02	9.69E+01	4.17E-02	3.72E-01	Eq. A.5	8.94E-01	3.29E-01	3.62E-01
Tetrachloroethene	3.34E-02	1.66E+02	1.66E-01	9.09E-01	Eq. A.5	2.18E+00	4.13E-01	4.52E-01
trans-1,2-Dichloroethene	1.10E-02	9.69E+01	4.17E-02	3.72E-01	Eq. A.5	8.94E-01	3.29E-01	3.62E-01
Trichloroethene	1.16E-02	1.31E+02	5.11E-02	5.81E-01	Eq. A.5	1.39E+00	3.35E-01	3.68E-01
Vinyl Chloride	8.38E-03	6.25E+01	2.55E-02	2.39E-01	Eq. A.5	5.73E-01	3.19E-01	3.51E-01

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table B-4

Estimation of DA_{event} for Dermal Contact with Organics in Groundwater (Resident Adult)

Alabama Army National Guard OMS #28

Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*, then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	**Fraction absorbed water**[1] (unitless)	**Permeability Constant**[2] (cm/hr)	**Concentration in Water**[3] (mg/L)	**Concentration in Water** (mg/cm3)	**Lag Time per Event**[4] (hr/event)	**Time to reach steady state**[5] (hr)	**Event Duration**[6] (hr/event)	**Molecular Weight**[2] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis**[7] (unitless)	**Formula Used**[8, 9]	**Absorbed Dose per Event**[8] (mg/cm3-event)	**Absorbed Dose per Event**[9] (mg/cm3-event)	**Absorbed Dose per Event**[10] (mg/cm3-event)
Chemical	FA	Kp	Cw (mg/L)	Cw (mg/cm ^{3})	τ_{event}	t*	t_{event}	MW	B	Formula	DA_{event} (Eq. 3.2)	DA_{event} (Eq. 3.3)	Final DA_{event} Adult
Groundwater													
Parcel A													
Tetrachloroethene	1.00E+00	3.34E-02	1.22E+01	1.22E-02	9.09E-01	2.18E+00	7.10E-01	1.66E+02	1.66E-01	Eq. 3.2	9.07E-04	-	9.07E-04
Trichloroethylene	1.00E+00	1.16E-02	1.79E-02	1.79E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	3.68E-07	-	3.68E-07
Parcel B													
Trichloroethylene	1.00E+00	1.16E-02	1.00E-02	1.00E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	2.06E-07	-	2.06E-07
Parcel C													
Trichloroethylene	1.00E+00	1.16E-02	4.43E-03	4.43E-06	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	9.12E-08	-	9.12E-08
Parcel D													
Trichloroethylene	1.00E+00	1.16E-02	1.98E-02	1.98E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	4.07E-07	-	4.07E-07
Parcel E													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	4.37E-03	4.37E-06	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	6.83E-08	-	6.83E-08
Trichloroethylene	1.00E+00	1.16E-02	1.45E-01	1.45E-04	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	2.98E-06	-	2.98E-06
Vinyl Chloride	1.00E+00	8.38E-03	3.40E-05	3.40E-08	2.39E-01	5.73E-01	7.10E-01	6.25E+01	2.55E-02	Eq. 3.3	-	3.37E-10	3.37E-10
Parcel F													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	8.99E-02	8.99E-05	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	1.41E-06	-	1.41E-06
Tetrachloroethene	1.00E+00	3.34E-02	1.90E-01	1.90E-04	9.09E-01	2.18E+00	7.10E-01	1.66E+02	1.66E-01	Eq. 3.2	1.41E-05	-	1.41E-05
trans-1,2-Dichloroethene	1.00E+00	1.10E-02	3.16E-02	3.16E-05	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	4.94E-07	-	4.94E-07
Trichloroethene	1.00E+00	1.16E-02	1.89E-01	1.89E-04	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	3.90E-06	-	3.90E-06
Vinyl Chloride	1.00E+00	8.38E-03	1.80E-04	1.80E-07	2.39E-01	5.73E-01	7.10E-01	6.25E+01	2.55E-02	Eq. 3.3	-	1.78E-09	1.78E-09

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

A default value of 1.0 was used for cis-1,2-dichloroethene, which is not listed in Exhibit B-3.

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Refer to Table 8 for groundwater concentration.

[4] Refer to Table C-2.

[5] Refer to Table C-3.

[6] Refer to Table C-1.

[7] Value estimated using Equation A-1 (USEPA 2004).

[8] Estimated using Equation 3-2 when $t_{event} \le t^*$ (USEPA 2004).

[9] Estimated Using Equation 3-3 when $t_{event} > t^*$ (USEPA 2004).

[10] DA_{event} from either Equation 3-2 or 3-3 depending on t_{event} (USEPA 2004).

Table B-5

Estimation of DA_{event} for Dermal Contact with Organics in Groundwater (Construction Worker)

Alabama Army National Guard OMS #28

Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*,\ then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*,\ then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	**Fraction absorbed water**[1] (unitless)	**Permeability Constant**[2] (cm/hr)	**Concentration in Water**[3] (mg/L)	**Concentration in Water** (mg/cm3)	**Lag Time per Event**[4] (hr/event)	**Time to reach steady state**[5] (hr)	**Event Duration**[6] (hr/event)	**Molecular Weight**[2] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis**[7] (unitless)	**Formula Used**[8, 9]	**Absorbed Dose per Event**[8] (mg/cm3-event)	**Absorbed Dose per Event**[9] (mg/cm3-event)	**Absorbed Dose per Event**[10] (mg/cm3-event)
Chemical	FA	Kp	Cw (mg/L)	Cw (mg/cm ^{3})	τ_{event}	t*	t_{event}	MW	B	Formula	DA_{event} (Eq. 3.2)	DA_{event} (Eq. 3.3)	Final DA_{event} Const Wkr
Groundwater													
Parcel A													
Tetrachloroethene	1.00E+00	3.34E-02	1.22E+01	1.22E-02	9.09E-01	2.18E+00	4.00E+00	1.66E+02	1.66E-01	Eq. 3.3	-	2.27E-03	2.27E-03
Trichloroethylene	1.00E+00	1.16E-02	1.79E-02	1.79E-05	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	1.04E-06	1.04E-06
Parcel B													
Trichloroethylene	1.00E+00	1.16E-02	1.00E-02	1.00E-05	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	5.83E-07	5.83E-07
Parcel C													
Trichloroethylene	1.00E+00	1.16E-02	4.43E-03	4.43E-06	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	2.58E-07	2.58E-07
Parcel D													
Trichloroethylene	1.00E+00	1.16E-02	1.98E-02	1.98E-05	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	1.15E-06	1.15E-06
Parcel E													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	4.37E-03	4.37E-06	3.72E-01	8.94E-01	4.00E+00	9.69E+01	4.17E-02	Eq. 3.3	-	2.22E-07	2.22E-07
Trichloroethylene	1.00E+00	1.16E-02	1.45E-01	1.45E-04	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	8.44E-06	8.44E-06
Vinyl Chloride	1.00E+00	8.38E-03	3.40E-05	3.40E-08	2.39E-01	5.73E-01	4.00E+00	6.25E+01	2.55E-02	Eq. 3.3	-	1.25E-09	1.25E-09
Parcel F													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	8.99E-02	8.99E-05	3.72E-01	8.94E-01	4.00E+00	9.69E+01	4.17E-02	Eq. 3.3	-	4.57E-06	4.57E-06
Tetrachloroethene	1.00E+00	3.34E-02	1.90E-01	1.90E-04	9.09E-01	2.18E+00	4.00E+00	1.66E+02	1.66E-01	Eq. 3.3	-	3.52E-05	3.52E-05
trans-1,2-Dichloroethene	1.00E+00	1.10E-02	3.16E-02	3.16E-05	3.72E-01	8.94E-01	4.00E+00	9.69E+01	4.17E-02	Eq. 3.3	-	1.60E-06	1.60E-06
Trichloroethene	1.00E+00	1.16E-02	1.89E-01	1.89E-04	5.81E-01	1.39E+00	4.00E+00	1.31E+02	5.11E-02	Eq. 3.3	-	1.10E-05	1.10E-05
Vinyl Chloride	1.00E+00	8.38E-03	1.80E-04	1.80E-07	2.39E-01	5.73E-01	4.00E+00	6.25E+01	2.55E-02	Eq. 3.3	-	6.62E-09	6.62E-09

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

A default value of 1.0 was used for cis-1,2-dichloroethene, which is not listed in Exhibit B-3.

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Refer to Table 8 for groundwater concentration.

[4] Refer to Table C-2.

[5] Refer to Table C-3.

[6] Refer to Table C-1.

[7] Value estimated using Equation A-1 (USEPA 2004).

[8] Estimated using Equation 3-2 when $t_{event} \le t^*$ (USEPA 2004).

[9] Estimated Using Equation 3-3 when $t_{event} > t^*$ (USEPA 2004).

[10] DA_{event} from either Equation 3-2 or 3-3 depending on t_{event} (USEPA 2004).

Table B-6

Estimation of DA_{event} for Dermal Contact with Organics in Groundwater (Industrial Worker)

Alabama Army National Guard OMS #28

Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*, then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	**Fraction absorbed water[1]** (unitless)	**Permeability Constant[2]** (cm/hr)	**Concentration in Water[3]** (mg/L)	**Concentration in Water** (mg/cm3)	**Lag Time per Event[4]** (hr/event)	**Time to reach steady state[5]** (hr)	**Event Duration[6]** (hr/event)	**Molecular Weight[2]** (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis[7]** (unitless)	**Formula Used[8, 9]**	**Absorbed Dose per Event[8]** (mg/cm3-event)	**Absorbed Dose per Event[9]** (mg/cm3-event)	**Absorbed Dose per Event[10]** (mg/cm3-event)
Chemical	FA	Kp	Cw (mg/L)	Cw (mg/cm^3)	τ_{event}	t*	t_{event}	MW	B	Formula	DA_{event} (Eq. 3.2)	DA_{event} (Eq. 3.3)	Final DA_{event} Ind Wkr
Groundwater													
Parcel A													
Tetrachloroethene	1.00E+00	3.34E-02	1.22E+01	1.22E-02	9.09E-01	2.18E+00	7.10E-01	1.66E+02	1.66E-01	Eq. 3.2	9.07E-04	-	9.07E-04
Trichloroethylene	1.00E+00	1.16E-02	1.79E-02	1.79E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	3.68E-07	-	3.68E-07
Parcel B													
Trichloroethylene	1.00E+00	1.16E-02	1.00E-02	1.00E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	2.06E-07	-	2.06E-07
Parcel C													
Trichloroethylene	1.00E+00	1.16E-02	4.43E-03	4.43E-06	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	9.12E-08	-	9.12E-08
Parcel D													
Trichloroethylene	1.00E+00	1.16E-02	1.98E-02	1.98E-05	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	4.07E-07	-	4.07E-07
Parcel E													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	4.37E-03	4.37E-06	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	6.83E-08	-	6.83E-08
Trichloroethylene	1.00E+00	1.16E-02	1.45E-01	1.45E-04	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	2.98E-06	-	2.98E-06
Vinyl Chloride	1.00E+00	8.38E-03	3.40E-05	3.40E-08	2.39E-01	5.73E-01	7.10E-01	6.25E+01	2.55E-02	Eq. 3.3	-	3.37E-10	3.37E-10
Parcel F													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	8.99E-02	8.99E-05	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	1.41E-06	-	1.41E-06
Tetrachloroethene	1.00E+00	3.34E-02	1.90E-01	1.90E-04	9.09E-01	2.18E+00	7.10E-01	1.66E+02	1.66E-01	Eq. 3.2	1.41E-05	-	1.41E-05
trans-1,2-Dichloroethene	1.00E+00	1.10E-02	3.16E-02	3.16E-05	3.72E-01	8.94E-01	7.10E-01	9.69E+01	4.17E-02	Eq. 3.2	4.94E-07	-	4.94E-07
Trichloroethene	1.00E+00	1.16E-02	1.89E-01	1.89E-04	5.81E-01	1.39E+00	7.10E-01	1.31E+02	5.11E-02	Eq. 3.2	3.90E-06	-	3.90E-06
Vinyl Chloride	1.00E+00	8.38E-03	1.80E-04	1.80E-07	2.39E-01	5.73E-01	7.10E-01	6.25E+01	2.55E-02	Eq. 3.3	-	1.78E-09	1.78E-09

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

A default value of 1.0 was used for cis-1,2-dichloroethene, which is not listed in Exhibit B-3.

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Refer to Table 8 for groundwater concentration.

[4] Refer to Table C-2.

[5] Refer to Table C-3.

[6] Refer to Table C-1.

[7] Value estimated using Equation A-1 (USEPA 2004).

[8] Estimated using Equation 3-2 when $t_{event} \le t^*$ (USEPA 2004).

[9] Estimated Using Equation 3-3 when $t_{event} > t^*$ (USEPA 2004).

[10] DA_{event} from either Equation 3-2 or 3-3 depending on t_{event} (USEPA 2004).

Table B-7

Estimation of DA_{event} for Dermal Contact with Organics in Groundwater (Resident Child)

Alabama Army National Guard OMS #28

Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*, then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*, then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	**Fraction absorbed water**[1] (unitless)	**Permeability Constant**[2] (cm/hr)	**Concentration in Water**[3] (mg/L)	**Concentration in Water** (mg/cm3)	**Lag Time per Event**[4] (hr/event)	**Time to reach steady state**[5] (hr)	**Event Duration**[6] (hr/event)	**Molecular Weight**[2] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis**[7] (unitless)	**Formula Used**[8, 9]	**Absorbed Dose per Event**[8] (mg/cm3-event)	**Absorbed Dose per Event**[9] (mg/cm3-event)	**Absorbed Dose per Event**[10] (mg/cm3-event)
Chemical	FA	Kp	Cw (mg/L)	Cw (mg/cm ^{3})	τ_{event}	t*	t_{event}	MW	B	Formula	DA_{event} (Eq. 3.2)	DA_{event} (Eq. 3.3)	Final DA_{event} Child
Groundwater													
Parcel A													
Tetrachloroethene	1.00E+00	3.34E-02	1.22E+01	1.22E-02	9.09E-01	2.18E+00	5.40E-01	1.66E+02	1.66E-01	Eq. 3.2	7.91E-04	-	7.91E-04
Trichloroethylene	1.00E+00	1.16E-02	1.79E-02	1.79E-05	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	3.21E-07	-	3.21E-07
Parcel B													
Trichloroethylene	1.00E+00	1.16E-02	1.00E-02	1.00E-05	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	1.80E-07	-	1.80E-07
Parcel C													
Trichloroethylene	1.00E+00	1.16E-02	4.43E-03	4.43E-06	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	7.96E-08	-	7.96E-08
Parcel D													
Trichloroethylene	1.00E+00	1.16E-02	1.98E-02	1.98E-05	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	3.55E-07	-	3.55E-07
Parcel E													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	4.37E-03	4.37E-06	3.72E-01	8.94E-01	5.40E-01	9.69E+01	4.17E-02	Eq. 3.2	5.96E-08	-	5.96E-08
Trichloroethylene	1.00E+00	1.16E-02	1.45E-01	1.45E-04	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	2.60E-06	-	2.60E-06
Vinyl Chloride	1.00E+00	8.38E-03	3.40E-05	3.40E-08	2.39E-01	5.73E-01	5.40E-01	6.25E+01	2.55E-02	Eq. 3.2	2.83E-10	-	2.83E-10
Parcel F													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	8.99E-02	8.99E-05	3.72E-01	8.94E-01	5.40E-01	9.69E+01	4.17E-02	Eq. 3.2	1.23E-06	-	1.23E-06
Tetrachloroethene	1.00E+00	3.34E-02	1.90E-01	1.90E-04	9.09E-01	2.18E+00	5.40E-01	1.66E+02	1.66E-01	Eq. 3.2	1.23E-05	-	1.23E-05
trans-1,2-Dichloroethene	1.00E+00	1.10E-02	3.16E-02	3.16E-05	3.72E-01	8.94E-01	5.40E-01	9.69E+01	4.17E-02	Eq. 3.2	4.31E-07	-	4.31E-07
Trichloroethene	1.00E+00	1.16E-02	1.89E-01	1.89E-04	5.81E-01	1.39E+00	5.40E-01	1.31E+02	5.11E-02	Eq. 3.2	3.40E-06	-	3.40E-06
Vinyl Chloride	1.00E+00	8.38E-03	1.80E-04	1.80E-07	2.39E-01	5.73E-01	5.40E-01	6.25E+01	2.55E-02	Eq. 3.2	1.50E-09	-	1.50E-09

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

A default value of 1.0 was used for cis-1,2-dichloroethene, which is not listed in Exhibit B-3.

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Refer to Table 8 for groundwater concentration.

[4] Refer to Table C-2.

[5] Refer to Table C-3.

[6] Refer to Table C-1.

[7] Value estimated using Equation A-1 (USEPA 2004).

[8] Estimated using Equation 3-2 when $t_{event} \le t^*$ (USEPA 2004).

[9] Estimated Using Equation 3-3 when $t_{event} > t^*$ (USEPA 2004).

[10] DA_{event} from either Equation 3-2 or 3-3 depending on t_{event} (USEPA 2004).

Table B-8

Estimation of DA_{event} for Dermal Contact with Organics in Groundwater (Age-Adjusted Resident Adult)

Alabama Army National Guard OMS #28

Mobile, Alabama

For organics,

$$If\ t_{event} \le t^*,\ then: DA_{event} = 2FA \times K_p \times C_w \sqrt{\frac{6\tau_{event} \times t_{event}}{\pi}}$$

$$If\ t_{event} > t^*,\ then: DA_{event} = FA \times K_p \times C_w \left[\frac{t_{event}}{1+B} + 2\tau_{event}\left(\frac{1+3B+3B^2}{(1+B)^2}\right)\right]$$

Parameter	**Fraction absorbed water**[1] (unitless)	**Permeability Constant**[2] (cm/hr)	**Concentration in Water**[3] (mg/L)	**Concentration in Water** (mg/cm3)	**Lag Time per Event**[4] (hr/event)	**Time to reach steady state**[5] (hr)	**Event Duration**[6] (hr/event)	**Molecular Weight**[2] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis**[7] (unitless)	**Formula Used**[8, 9]	**Absorbed Dose per Event**[8] (mg/cm3-event)	**Absorbed Dose per Event**[9] (mg/cm3-event)	**Absorbed Dose per Event**[10] (mg/cm3-event)
Chemical	FA	Kp	Cw (mg/L)	Cw (mg/cm^3)	τ_{event}	t*	t_{event}	MW	B	Formula	DA_{event} (Eq. 3.2)	DA_{event} (Eq. 3.3)	Final DA_{event} Adult
Groundwater													
Parcel A													
Tetrachloroethene	1.00E+00	3.34E-02	1.22E+01	1.22E-02	9.09E-01	2.18E+00	6.70E-01	1.66E+02	1.66E-01	Eq. 3.2	8.81E-04	-	8.81E-04
Trichloroethylene	1.00E+00	1.16E-02	1.79E-02	1.79E-05	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	3.57E-07	-	3.57E-07
Parcel B													
Trichloroethylene	1.00E+00	1.16E-02	1.00E-02	1.00E-05	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	2.00E-07	-	2.00E-07
Parcel C													
Trichloroethylene	1.00E+00	1.16E-02	4.43E-03	4.43E-06	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	8.86E-08	-	8.86E-08
Parcel D													
Trichloroethylene	1.00E+00	1.16E-02	1.98E-02	1.98E-05	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	3.95E-07	-	3.95E-07
Parcel E													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	4.37E-03	4.37E-06	3.72E-01	8.94E-01	6.70E-01	9.69E+01	4.17E-02	Eq. 3.2	6.64E-08	-	6.64E-08
Trichloroethylene	1.00E+00	1.16E-02	1.45E-01	1.45E-04	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	2.90E-06	-	2.90E-06
Vinyl Chloride	1.00E+00	8.38E-03	3.40E-05	3.40E-08	2.39E-01	5.73E-01	6.70E-01	6.25E+01	2.55E-02	Eq. 3.3	-	3.26E-10	3.26E-10
Parcel F													
cis-1,2-Dichloroethene	1.00E+00	1.10E-02	8.99E-02	8.99E-05	3.72E-01	8.94E-01	6.70E-01	9.69E+01	4.17E-02	Eq. 3.2	1.37E-06	-	1.37E-06
Tetrachloroethene	1.00E+00	3.34E-02	1.90E-01	1.90E-04	9.09E-01	2.18E+00	6.70E-01	1.66E+02	1.66E-01	Eq. 3.2	1.37E-05	-	1.37E-05
trans-1,2-Dichloroethene	1.00E+00	1.10E-02	3.16E-02	3.16E-05	3.72E-01	8.94E-01	6.70E-01	9.69E+01	4.17E-02	Eq. 3.2	4.80E-07	-	4.80E-07
Trichloroethene	1.00E+00	1.16E-02	1.89E-01	1.89E-04	5.81E-01	1.39E+00	6.70E-01	1.31E+02	5.11E-02	Eq. 3.2	3.79E-06	-	3.79E-06
Vinyl Chloride	1.00E+00	8.38E-03	1.80E-04	1.80E-07	2.39E-01	5.73E-01	6.70E-01	6.25E+01	2.55E-02	Eq. 3.3	-	1.72E-09	1.72E-09

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

A default value of 1.0 was used for cis-1,2-dichloroethene, which is not listed in Exhibit B-3.

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Refer to Table 8 for groundwater concentration.

[4] Refer to Table C-2.

[5] Refer to Table C-3.

[6] Refer to Table C-1.

[7] Value estimated using Equation A-1 (USEPA 2004).

[8] Estimated using Equation 3-2 when $t_{event} \le t^*$ (USEPA 2004).

[9] Estimated Using Equation 3-3 when $t_{event} > t^*$ (USEPA 2004).

[10] DA_{event} from either Equation 3-2 or 3-3 depending on t_{event} (USEPA 2004).

Table B-9
Groundwater Vapors in a Trench
Alabama Army National Guard OMS #28
Mobile, Alabama

For Mass-Transfer Coefficients

Kg,H2O	0.833	cm/s
MWH2O	18	
Kl,O2	0.002	cm/s
MWO2	32	
T	**77**	F
T	298	K
R	8.20E-05	atm-m3/mol-K

For Emission Flux and Concentration in Trench

CF1	1.00E-03	L/cm3
CF2	1.00E+04	cm2/m2
CF3	3600	s/hr
F	**1**	
ACH	2	hr-1

Trench Dimensions

Length	**8**	ft
	2.44	m
Width	**3**	ft
	0.91	m
Depth	**8**	ft
	2.44	m
Width/Depth	0.38	

APPENDIX C

PROUCL OUTPUT

(Provided on CD)

Human Health ProUCL Output
Surface Soil

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.16/19/2018 11:50:52 AM
From File	Input SS.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

A-Tetrachloroethene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.00116	Minimum Non-Detect	0.002
Maximum Detect	329	Maximum Non-Detect	0.002
Variance Detects	14732	Percent Non-Detects	12.5%
Mean Detects	54.28	SD Detects	121.4
Median Detects	8.903	CV Detects	2.236
Skewness Detects	2.624	Kurtosis Detects	6.913
Mean of Logged Detects	0.701	SD of Logged Detects	4.385

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.511	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.469	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	47.49	KM Standard Error of Mean	40.72
KM SD	106.6	95% KM (BCA) UCL	127.9
95% KM (t) UCL	124.6	95% KM (Percentile Bootstrap) UCL	126.5
95% KM (z) UCL	114.5	95% KM Bootstrap t UCL	831.9
90% KM Chebyshev UCL	169.7	95% KM Chebyshev UCL	225
97.5% KM Chebyshev UCL	301.8	99% KM Chebyshev UCL	452.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.369	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.815	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.237	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.341	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.22	k star (bias corrected MLE)	0.221
Theta hat (MLE)	246.6	Theta star (bias corrected MLE)	245.6
nu hat (MLE)	3.082	nu star (bias corrected)	3.094
Mean (detects)	54.28		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

A-Tetrachloroethene

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00116	Mean	47.5
Maximum	329	Median	7.373
SD	114	CV	2.4
k hat (MLE)	0.194	k star (bias corrected MLE)	0.204
Theta hat (MLE)	245.5	Theta star (bias corrected MLE)	232.5
nu hat (MLE)	3.096	nu star (bias corrected)	3.268
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (3.27, α)	0.456	Adjusted Chi Square Value (3.27, β)	0.265
95% Gamma Approximate UCL (use when n>=50)	340.3	95% Gamma Adjusted UCL (use when n<50)	585.2

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	47.49	SD (KM)	106.6
Variance (KM)	11371	SE of Mean (KM)	40.72
k hat (KM)	0.198	k star (KM)	0.207
nu hat (KM)	3.174	nu star (KM)	3.317
theta hat (KM)	239.4	theta star (KM)	229.1
80% gamma percentile (KM)	63.74	90% gamma percentile (KM)	143.6
95% gamma percentile (KM)	242.4	99% gamma percentile (KM)	512.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.32, α)	0.472	Adjusted Chi Square Value (3.32, β)	0.275
95% Gamma Approximate KM-UCL (use when n>=50)	333.6	95% Gamma Adjusted KM-UCL (use when n<50)	572

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data Not Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	47.49	Mean in Log Scale	-0.155
SD in Original Scale	114	SD in Log Scale	4.727
95% t UCL (assumes normality of ROS data)	123.9	95% Percentile Bootstrap UCL	126.9
95% BCA Bootstrap UCL	166.7	95% Bootstrap t UCL	854.5
95% H-UCL (Log ROS)	4.802E+15		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.231	KM Geo Mean	0.793
KM SD (logged)	4.529	95% Critical H Value (KM-Log)	13.46
KM Standard Error of Mean (logged)	1.73	95% H-UCL (KM -Log)	2.313E+14
KM SD (logged)	4.529	95% Critical H Value (KM-Log)	13.46
KM Standard Error of Mean (logged)	1.73		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	47.49	Mean in Log Scale	-0.25
SD in Original Scale	114	SD in Log Scale	4.87
95% t UCL (Assumes normality)	123.9	95% H-Stat UCL	4.016E+16

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	831.9	a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	572

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Human Health ProUCL Output
Subsurface Soil

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.16/19/2018 11:53:53 AM
From File	Input SSS.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

A-Tetrachloroethene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	4
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.00244	Minimum Non-Detect	0.002
Maximum Detect	53.7	Maximum Non-Detect	0.002
Variance Detects	269.1	Percent Non-Detects	25%
Mean Detects	6.578	SD Detects	16.4
Median Detects	0.0884	CV Detects	2.494
Skewness Detects	2.658	Kurtosis Detects	6.955
Mean of Logged Detects	-2.026	SD of Logged Detects	3.001

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.477	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.484	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.934	KM Standard Error of Mean	3.629
KM SD	13.9	95% KM (BCA) UCL	11.33
95% KM (t) UCL	11.29	95% KM (Percentile Bootstrap) UCL	11.63
95% KM (z) UCL	10.9	95% KM Bootstrap t UCL	1061
90% KM Chebyshev UCL	15.82	95% KM Chebyshev UCL	20.75
97.5% KM Chebyshev UCL	27.59	99% KM Chebyshev UCL	41.04

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.824	Anderson-Darling GOF Test
5% A-D Critical Value	0.881	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.412	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.273	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.19	k star (bias corrected MLE)	0.198
Theta hat (MLE)	34.66	Theta star (bias corrected MLE)	33.24
nu hat (MLE)	4.554	nu star (bias corrected)	4.749
Mean (detects)	6.578		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00244	Mean	4.936
Maximum	53.7	Median	0.0496
SD	14.35	CV	2.908

Human Health ProUCL Output
Subsurface Soil

A-Tetrachloroethene

k hat (MLE)	0.176	k star (bias corrected MLE)	0.185
Theta hat (MLE)	28.06	Theta star (bias corrected MLE)	26.74
nu hat (MLE)	5.629	nu star (bias corrected)	5.907
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (5.91, α)	1.592	Adjusted Chi Square Value (5.91, β)	1.352
95% Gamma Approximate UCL (use when n>=50)	18.31	95% Gamma Adjusted UCL (use when n<50)	21.56

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.934	SD (KM)	13.9
Variance (KM)	193.1	SE of Mean (KM)	3.629
k hat (KM)	0.126	k star (KM)	0.144
nu hat (KM)	4.034	nu star (KM)	4.611
theta hat (KM)	39.14	theta star (KM)	34.24
80% gamma percentile (KM)	5.191	90% gamma percentile (KM)	14.54
95% gamma percentile (KM)	27.36	99% gamma percentile (KM)	64.88

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.61, α)	0.977	Adjusted Chi Square Value (4.61, β)	0.804
95% Gamma Approximate KM-UCL (use when n>=50)	23.29	95% Gamma Adjusted KM-UCL (use when n<50)	28.29

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.855	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.255	Lilliefors GOF Test
5% Lilliefors Critical Value	0.243	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.933	Mean in Log Scale	-3.765
SD in Original Scale	14.35	SD in Log Scale	4.091
95% t UCL (assumes normality of ROS data)	11.22	95% Percentile Bootstrap UCL	11.35
95% BCA Bootstrap UCL	14.99	95% Bootstrap t UCL	1055
95% H-UCL (Log ROS)	890970		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.073	KM Geo Mean	0.0463
KM SD (logged)	3.079	95% Critical H Value (KM-Log)	6.579
KM Standard Error of Mean (logged)	0.804	95% H-UCL (KM -Log)	990.2
KM SD (logged)	3.079	95% Critical H Value (KM-Log)	6.579
KM Standard Error of Mean (logged)	0.804		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.934	Mean in Log Scale	-3.247
SD in Original Scale	14.35	SD in Log Scale	3.372
95% t UCL (Assumes normality)	11.22	95% H-Stat UCL	5864

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL 41.04

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/15/2022 4:09:04 PM
From File	Input GW Plumes.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Parcel A - Tetrachloroethene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	14
Number of Detects	13	Number of Non-Detects	5
Number of Distinct Detects	13	Number of Distinct Non-Detects	1
Minimum Detect	0.863	Minimum Non-Detect	1
Maximum Detect	40000	Maximum Non-Detect	1
Variance Detects	1.210E+8	Percent Non-Detects	27.78%
Mean Detects	3447	SD Detects	11000
Median Detects	95.7	CV Detects	3.191
Skewness Detects	3.586	Kurtosis Detects	12.89
Mean of Logged Detects	4.568	SD of Logged Detects	3.092

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.351	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.483	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2490	KM Standard Error of Mean	2236
KM SD	9113	95% KM (BCA) UCL	6905
95% KM (t) UCL	6379	95% KM (Percentile Bootstrap) UCL	6876
95% KM (z) UCL	6167	95% KM Bootstrap t UCL	60392
90% KM Chebyshev UCL	9197	95% KM Chebyshev UCL	12235
97.5% KM Chebyshev UCL	16452	99% KM Chebyshev UCL	24735

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.191	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.871	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.297	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.262	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.205	k star (bias corrected MLE)	0.209
Theta hat (MLE)	16819	Theta star (bias corrected MLE)	16498
nu hat (MLE)	5.328	nu star (bias corrected)	5.432
Mean (detects)	3447		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2489
Maximum	40000	Median	56.2
SD	9378	CV	3.767

Parcel A - Tetrachloroethene

k hat (MLE)	0.135	k star (bias corrected MLE)	0.149
Theta hat (MLE)	18497	Theta star (bias corrected MLE)	16686
nu hat (MLE)	4.845	nu star (bias corrected)	5.371
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (5.37, α)	1.327	Adjusted Chi Square Value (5.37, β)	1.146
95% Gamma Approximate UCL (use when n>=50)	10073	95% Gamma Adjusted UCL (use when n<50)	11665

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2490	SD (KM)	9113
Variance (KM)	83053675	SE of Mean (KM)	2236
k hat (KM)	0.0746	k star (KM)	0.0992
nu hat (KM)	2.687	nu star (KM)	3.572
theta hat (KM)	33360	theta star (KM)	25090
80% gamma percentile (KM)	1708	90% gamma percentile (KM)	6605
95% gamma percentile (KM)	14457	99% gamma percentile (KM)	39701

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.57, α)	0.56	Adjusted Chi Square Value (3.57, β)	0.462
95% Gamma Approximate KM-UCL (use when n>=50)	15870	95% Gamma Adjusted KM-UCL (use when n<50)	19230

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2490	Mean in Log Scale	2.9
SD in Original Scale	9378	SD in Log Scale	3.88
95% t UCL (assumes normality of ROS data)	6335	95% Percentile Bootstrap UCL	6891
95% BCA Bootstrap UCL	9281	95% Bootstrap t UCL	56655
95% H-UCL (Log ROS)	55476623		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.258	KM Geo Mean	26
KM SD (logged)	3.291	95% Critical H Value (KM-Log)	6.735
KM Standard Error of Mean (logged)	0.807	95% H-UCL (KM -Log)	1265468
KM SD (logged)	3.291	95% Critical H Value (KM-Log)	6.735
KM Standard Error of Mean (logged)	0.807		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2490	Mean in Log Scale	3.106
SD in Original Scale	9378	SD in Log Scale	3.553
95% t UCL (Assumes normality)	6335	95% H-Stat UCL	6315484

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	24735

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel A - Trichloroethene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	7
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.751	Minimum Non-Detect	1
Maximum Detect	46	Maximum Non-Detect	1
Variance Detects	309.8	Percent Non-Detects	38.89%
Mean Detects	17.8	SD Detects	17.6
Median Detects	13.5	CV Detects	0.989
Skewness Detects	0.518	Kurtosis Detects	-1.622
Mean of Logged Detects	2.03	SD of Logged Detects	1.642

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	11.2	KM Standard Error of Mean	3.834
KM SD	15.51	95% KM (BCA) UCL	18.05
95% KM (t) UCL	17.87	95% KM (Percentile Bootstrap) UCL	17.75
95% KM (z) UCL	17.51	95% KM Bootstrap t UCL	19.8
90% KM Chebyshev UCL	22.7	95% KM Chebyshev UCL	27.91
97.5% KM Chebyshev UCL	35.14	99% KM Chebyshev UCL	49.35

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.552	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.71	k star (bias corrected MLE)	0.577
Theta hat (MLE)	25.06	Theta star (bias corrected MLE)	30.83
nu hat (MLE)	15.63	nu star (bias corrected)	12.7
Mean (detects)	17.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	11.37
Maximum	46	Median	3.081
SD	15.88	CV	1.396
k hat (MLE)	0.329	k star (bias corrected MLE)	0.311
Theta hat (MLE)	34.56	Theta star (bias corrected MLE)	36.54
nu hat (MLE)	11.85	nu star (bias corrected)	11.21
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (11.21, α)	4.71	Adjusted Chi Square Value (11.21, β)	4.311
95% Gamma Approximate UCL (use when n>=50)	27.07	95% Gamma Adjusted UCL (use when n<50)	29.57

Parcel A - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	11.2	SD (KM)	15.51
Variance (KM)	240.5	SE of Mean (KM)	3.834
k hat (KM)	0.522	k star (KM)	0.472
nu hat (KM)	18.78	nu star (KM)	16.98
theta hat (KM)	21.47	theta star (KM)	23.75
80% gamma percentile (KM)	18.34	90% gamma percentile (KM)	30.67
95% gamma percentile (KM)	43.93	99% gamma percentile (KM)	76.72

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (16.98, α)	8.658	Adjusted Chi Square Value (16.98, β)	8.091
95% Gamma Approximate KM-UCL (use when n>=50)	21.97	95% Gamma Adjusted KM-UCL (use when n<50)	23.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	11.39	Mean in Log Scale	1.213
SD in Original Scale	15.84	SD in Log Scale	1.741
95% t UCL (assumes normality of ROS data)	17.88	95% Percentile Bootstrap UCL	17.59
95% BCA Bootstrap UCL	18.26	95% Bootstrap t UCL	19.25
95% H-UCL (Log ROS)	77.8		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.167	KM Geo Mean	3.212
KM SD (logged)	1.634	95% Critical H Value (KM-Log)	3.664
KM Standard Error of Mean (logged)	0.405	95% H-UCL (KM -Log)	52.2
KM SD (logged)	1.634	95% Critical H Value (KM-Log)	3.664
KM Standard Error of Mean (logged)	0.405		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	11.07	Mean in Log Scale	0.971
SD in Original Scale	16.05	SD in Log Scale	1.858
95% t UCL (Assumes normality)	17.65	95% H-Stat UCL	92.39

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	17.87

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel B - Trichloroethene

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Parcel B - Trichloroethene was not processed!

Parcel C - Trichloroethene

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	0
Minimum	4.43	Mean	4.43
Maximum	4.43	Median	4.43

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Parcel C - Trichloroethene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Parcel D - Trichloroethene

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	1.3	Minimum Non-Detect	1
Maximum Detect	27.1	Maximum Non-Detect	1
Variance Detects	121.7	Percent Non-Detects	20%
Mean Detects	11.38	SD Detects	11.03
Median Detects	8.56	CV Detects	0.969
Skewness Detects	1.397	Kurtosis Detects	2.605
Mean of Logged Detects	1.963	SD of Logged Detects	1.258

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.335	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	9.304	KM Standard Error of Mean	4.906
KM SD	9.5	95% KM (BCA) UCL	N/A
95% KM (t) UCL	19.76	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	17.37	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	24.02	95% KM Chebyshev UCL	30.69
97.5% KM Chebyshev UCL	39.94	99% KM Chebyshev UCL	58.12

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.292	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.665	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.401	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.207	k star (bias corrected MLE)	0.468
Theta hat (MLE)	9.432	Theta star (bias corrected MLE)	24.3
nu hat (MLE)	9.652	nu star (bias corrected)	3.746
Mean (detects)	11.38		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	9.106
Maximum	27.1	Median	8.1
SD	10.82	CV	1.188
k hat (MLE)	0.419	k star (bias corrected MLE)	0.301
Theta hat (MLE)	21.74	Theta star (bias corrected MLE)	30.26
nu hat (MLE)	4.189	nu star (bias corrected)	3.009
Adjusted Level of Significance (β)	0.0086		
Approximate Chi Square Value (3.01, α)	0.375	Adjusted Chi Square Value (3.01, β)	0.14
95% Gamma Approximate UCL (use when n>=50)	73.05	95% Gamma Adjusted UCL (use when n<50)	N/A

Parcel D - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.304	SD (KM)	9.5
Variance (KM)	90.25	SE of Mean (KM)	4.906
k hat (KM)	0.959	k star (KM)	0.517
nu hat (KM)	9.592	nu star (KM)	5.17
theta hat (KM)	9.7	theta star (KM)	18
80% gamma percentile (KM)	15.3	90% gamma percentile (KM)	25
95% gamma percentile (KM)	35.32	99% gamma percentile (KM)	60.62

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (5.17, α)	1.232	Adjusted Chi Square Value (5.17, β)	0.582
95% Gamma Approximate KM-UCL (use when n>=50)	39.06	95% Gamma Adjusted KM-UCL (use when n<50)	82.68

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	9.162	Mean in Log Scale	1.322
SD in Original Scale	10.76	SD in Log Scale	1.802
95% t UCL (assumes normality of ROS data)	19.42	95% Percentile Bootstrap UCL	16.78
95% BCA Bootstrap UCL	18.32	95% Bootstrap t UCL	28.69
95% H-UCL (Log ROS)	39684		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.571	KM Geo Mean	4.81
KM SD (logged)	1.252	95% Critical H Value (KM-Log)	6.009
KM Standard Error of Mean (logged)	0.646	95% H-UCL (KM -Log)	452.6
KM SD (logged)	1.252	95% Critical H Value (KM-Log)	6.009
KM Standard Error of Mean (logged)	0.646		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	9.204	Mean in Log Scale	1.432
SD in Original Scale	10.72	SD in Log Scale	1.612
95% t UCL (Assumes normality)	19.43	95% H-Stat UCL	7176

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	19.76

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel E - cis-1,2-Dichloroethene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	3
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.521	Minimum Non-Detect	0.5
Maximum Detect	7.56	Maximum Non-Detect	0.5
Variance Detects	6.5	Percent Non-Detects	37.5%
Mean Detects	3.806	SD Detects	2.549
Median Detects	3.71	CV Detects	0.67
Skewness Detects	0.424	Kurtosis Detects	1.344
Mean of Logged Detects	1.043	SD of Logged Detects	1.011

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.971	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.217	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.566	KM Standard Error of Mean	0.953
KM SD	2.411	95% KM (BCA) UCL	4.005
95% KM (t) UCL	4.372	95% KM (Percentile Bootstrap) UCL	3.953
95% KM (z) UCL	4.134	95% KM Bootstrap t UCL	4.173
90% KM Chebyshev UCL	5.425	95% KM Chebyshev UCL	6.72
97.5% KM Chebyshev UCL	8.517	99% KM Chebyshev UCL	12.05

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.343	Anderson-Darling GOF Test
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.851	k star (bias corrected MLE)	0.874
Theta hat (MLE)	2.056	Theta star (bias corrected MLE)	4.355
nu hat (MLE)	18.51	nu star (bias corrected)	8.739
Mean (detects)	3.806		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.383
Maximum	7.56	Median	1.711
SD	2.752	CV	1.155
k hat (MLE)	0.347	k star (bias corrected MLE)	0.3
Theta hat (MLE)	6.875	Theta star (bias corrected MLE)	7.944
nu hat (MLE)	5.545	nu star (bias corrected)	4.799
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (4.80, α)	1.061	Adjusted Chi Square Value (4.80, β)	0.686
95% Gamma Approximate UCL (use when n>=50)	10.78	95% Gamma Adjusted UCL (use when n<50)	16.66

Parcel E - cis-1,2-Dichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.566	SD (KM)	2.411
Variance (KM)	5.812	SE of Mean (KM)	0.953
k hat (KM)	1.133	k star (KM)	0.792
nu hat (KM)	18.13	nu star (KM)	12.67
theta hat (KM)	2.265	theta star (KM)	3.242
80% gamma percentile (KM)	4.196	90% gamma percentile (KM)	6.256
95% gamma percentile (KM)	8.357	99% gamma percentile (KM)	13.32

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.67, α)	5.669	Adjusted Chi Square Value (12.67, β)	4.541
95% Gamma Approximate KM-UCL (use when n>=50)	5.734	95% Gamma Adjusted KM-UCL (use when n<50)	7.158

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.476	Mean in Log Scale	0.0973
SD in Original Scale	2.663	SD in Log Scale	1.55
95% t UCL (assumes normality of ROS data)	4.26	95% Percentile Bootstrap UCL	4.002
95% BCA Bootstrap UCL	4.261	95% Bootstrap t UCL	4.84
95% H-UCL (Log ROS)	63.83		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.392	KM Geo Mean	1.48
KM SD (logged)	1.103	95% Critical H Value (KM-Log)	3.685
KM Standard Error of Mean (logged)	0.436	95% H-UCL (KM -Log)	12.64
KM SD (logged)	1.103	95% Critical H Value (KM-Log)	3.685
KM Standard Error of Mean (logged)	0.436		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.473	Mean in Log Scale	0.132
SD in Original Scale	2.665	SD in Log Scale	1.471
95% t UCL (Assumes normality)	4.258	95% H-Stat UCL	44.98

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	4.372

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel E - Trichloroethene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	3
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	6.26	Minimum Non-Detect	0.5
Maximum Detect	291	Maximum Non-Detect	0.5
Variance Detects	15173	Percent Non-Detects	30%
Mean Detects	110.2	SD Detects	123.2
Median Detects	42.4	CV Detects	1.118
Skewness Detects	0.844	Kurtosis Detects	-1.382
Mean of Logged Detects	3.901	SD of Logged Detects	1.511

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.28	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	77.29	KM Standard Error of Mean	36.84
KM SD	107.8	95% KM (BCA) UCL	136.7
95% KM (t) UCL	144.8	95% KM (Percentile Bootstrap) UCL	136
95% KM (z) UCL	137.9	95% KM Bootstrap t UCL	219.3
90% KM Chebyshev UCL	187.8	95% KM Chebyshev UCL	237.9
97.5% KM Chebyshev UCL	307.3	99% KM Chebyshev UCL	443.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.418	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.221	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.323	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.747	k star (bias corrected MLE)	0.522
Theta hat (MLE)	147.4	Theta star (bias corrected MLE)	210.9
nu hat (MLE)	10.46	nu star (bias corrected)	7.313
Mean (detects)	110.2		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	77.14
Maximum	291	Median	16.35
SD	113.8	CV	1.475
k hat (MLE)	0.239	k star (bias corrected MLE)	0.234
Theta hat (MLE)	323	Theta star (bias corrected MLE)	329.9
nu hat (MLE)	4.776	nu star (bias corrected)	4.677
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (4.68, α)	1.006	Adjusted Chi Square Value (4.68, β)	0.746
95% Gamma Approximate UCL (use when n>=50)	358.7	95% Gamma Adjusted UCL (use when n<50)	483.3

Parcel E - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	77.29	SD (KM)	107.8
Variance (KM)	11631	SE of Mean (KM)	36.84
k hat (KM)	0.514	k star (KM)	0.426
nu hat (KM)	10.27	nu star (KM)	8.523
theta hat (KM)	150.5	theta star (KM)	181.4
80% gamma percentile (KM)	125.6	90% gamma percentile (KM)	215.8
95% gamma percentile (KM)	314.1	99% gamma percentile (KM)	559.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.52, α)	3.042	Adjusted Chi Square Value (8.52, β)	2.501
95% Gamma Approximate KM-UCL (use when n>=50)	216.6	95% Gamma Adjusted KM-UCL (use when n<50)	263.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	77.53	Mean in Log Scale	2.741
SD in Original Scale	113.5	SD in Log Scale	2.276
95% t UCL (assumes normality of ROS data)	143.3	95% Percentile Bootstrap UCL	138.5
95% BCA Bootstrap UCL	150.4	95% Bootstrap t UCL	229.6
95% H-UCL (Log ROS)	20643		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.523	KM Geo Mean	12.46
KM SD (logged)	2.409	95% Critical H Value (KM-Log)	6.395
KM Standard Error of Mean (logged)	0.823	95% H-UCL (KM -Log)	38523
KM SD (logged)	2.409	95% Critical H Value (KM-Log)	6.395
KM Standard Error of Mean (logged)	0.823		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	77.21	Mean in Log Scale	2.315
SD in Original Scale	113.7	SD in Log Scale	2.836
95% t UCL (Assumes normality)	143.1	95% H-Stat UCL	651033

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 144.8

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel E - Vinyl chloride

General Statistics

Total Number of Observations	8	Number of Distinct Observations	4
Number of Detects	3	Number of Non-Detects	5
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	0.022	Minimum Non-Detect	0.05
Maximum Detect	0.034	Maximum Non-Detect	0.05
Variance Detects	3.6000E-5	Percent Non-Detects	62.5%
Mean Detects	0.028	SD Detects	0.006
Median Detects	0.028	CV Detects	0.214
Skewness Detects	5.331E-15	Kurtosis Detects	N/A
Mean of Logged Detects	-3.591	SD of Logged Detects	0.218

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.028	KM Standard Error of Mean	0.00346
KM SD	0.0049	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0346	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0337	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0384	95% KM Chebyshev UCL	0.0431
97.5% KM Chebyshev UCL	0.0496	99% KM Chebyshev UCL	0.0625

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	32.08	k star (bias corrected MLE)	N/A
Theta hat (MLE)	8.7291E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	192.5	nu star (bias corrected)	N/A
Mean (detects)	0.028		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0197	Mean	0.028
Maximum	0.0369	Median	0.0279
SD	0.00597	CV	0.213
k hat (MLE)	24.72	k star (bias corrected MLE)	15.53
Theta hat (MLE)	0.00113	Theta star (bias corrected MLE)	0.00181
nu hat (MLE)	395.6	nu star (bias corrected)	248.6
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (248.55, α)	213.1	Adjusted Chi Square Value (248.55, β)	204.7
95% Gamma Approximate UCL (use when n>=50)	0.0327	95% Gamma Adjusted UCL (use when n<50)	N/A

Parcel E - Vinyl chloride

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.028	SD (KM)	0.0049
Variance (KM)	2.4000E-5	SE of Mean (KM)	0.00346
k hat (KM)	32.67	k star (KM)	20.5
nu hat (KM)	522.7	nu star (KM)	328
theta hat (KM)	8.5714E-4	theta star (KM)	0.00137
80% gamma percentile (KM)	0.033	90% gamma percentile (KM)	0.0362
95% gamma percentile (KM)	0.0389	99% gamma percentile (KM)	0.0444

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (328.00, α)	287	Adjusted Chi Square Value (328.00, β)	277.3
95% Gamma Approximate KM-UCL (use when n>=50)	0.032	95% Gamma Adjusted KM-UCL (use when n<50)	0.0331

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.996	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0281	Mean in Log Scale	-3.591
SD in Original Scale	0.00605	SD in Log Scale	0.217
95% t UCL (assumes normality of ROS data)	0.0322	95% Percentile Bootstrap UCL	0.0314
95% BCA Bootstrap UCL	0.0314	95% Bootstrap t UCL	0.0327
95% H-UCL (Log ROS)	0.0331		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.591	KM Geo Mean	0.0276
KM SD (logged)	0.178	95% Critical H Value (KM-Log)	1.921
KM Standard Error of Mean (logged)	0.126	95% H-UCL (KM -Log)	0.0319
KM SD (logged)	0.178	95% Critical H Value (KM-Log)	1.921
KM Standard Error of Mean (logged)	0.126		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0261	Mean in Log Scale	-3.652
SD in Original Scale	0.00356	SD in Log Scale	0.127
95% t UCL (Assumes normality)	0.0285	95% H-Stat UCL	0.0286

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0346

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - cis-1,2-Dichloroethene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	0.927	Mean	33.54
Maximum	103	Median	15.12
SD	47.92	Std. Error of Mean	23.96
Coefficient of Variation	1.429	Skewness	1.637

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.804	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	89.93	95% Adjusted-CLT UCL (Chen-1995)	93.9
		95% Modified-t UCL (Johnson-1978)	93.19

Gamma GOF Test

A-D Test Statistic	0.3	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.683	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.279	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.411	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.484	k star (bias corrected MLE)	0.288
Theta hat (MLE)	69.29	Theta star (bias corrected MLE)	116.6
nu hat (MLE)	3.873	nu star (bias corrected)	2.301
MLE Mean (bias corrected)	33.54	MLE Sd (bias corrected)	62.54
		Approximate Chi Square Value (0.05)	0.2
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	386.7	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0758	Mean of logged Data	2.194
Maximum of Logged Data	4.635	SD of logged Data	2.167

Assuming Lognormal Distribution

95% H-UCL	4.802E+9	90% Chebyshev (MVUE) UCL	120.7
95% Chebyshev (MVUE) UCL	159.3	97.5% Chebyshev (MVUE) UCL	212.9
99% Chebyshev (MVUE) UCL	318.1		

Parcel F - cis-1,2-Dichloroethene

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	72.95	95% Jackknife UCL	89.93
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	105.4	95% Chebyshev(Mean, Sd) UCL	138
97.5% Chebyshev(Mean, Sd) UCL	183.2	99% Chebyshev(Mean, Sd) UCL	271.9

Suggested UCL to Use

95% Student's-t UCL	89.93

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Tetrachloroethene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	7
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	11.85	Minimum Non-Detect	0.5
Maximum Detect	460	Maximum Non-Detect	1
Variance Detects	49563	Percent Non-Detects	58.33%
Mean Detects	221.3	SD Detects	222.6
Median Detects	154	CV Detects	1.006
Skewness Detects	0.354	Kurtosis Detects	-3.096
Mean of Logged Detects	4.601	SD of Logged Detects	1.674

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.813	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	92.5	KM Standard Error of Mean	54.36
KM SD	168.4	95% KM (BCA) UCL	170.9
95% KM (t) UCL	190.1	95% KM (Percentile Bootstrap) UCL	172.3
95% KM (z) UCL	181.9	95% KM Bootstrap t UCL	275.3
90% KM Chebyshev UCL	255.6	95% KM Chebyshev UCL	329.5
97.5% KM Chebyshev UCL	432	99% KM Chebyshev UCL	633.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.423	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.367	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.75	k star (bias corrected MLE)	0.433
Theta hat (MLE)	295.1	Theta star (bias corrected MLE)	510.7
nu hat (MLE)	7.501	nu star (bias corrected)	4.334
Mean (detects)	221.3		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	92.22
Maximum	460	Median	0.01
SD	176.1	CV	1.91
k hat (MLE)	0.146	k star (bias corrected MLE)	0.165
Theta hat (MLE)	632.5	Theta star (bias corrected MLE)	559.2
nu hat (MLE)	3.499	nu star (bias corrected)	3.958
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (3.96, α)	0.705	Adjusted Chi Square Value (3.96, β)	0.527
95% Gamma Approximate UCL (use when n>=50)	517.7	95% Gamma Adjusted UCL (use when n<50)	692.4

Parcel F - Tetrachloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	92.5	SD (KM)	168.4
Variance (KM)	28372	SE of Mean (KM)	54.36
k hat (KM)	0.302	k star (KM)	0.282
nu hat (KM)	7.239	nu star (KM)	6.762
theta hat (KM)	306.7	theta star (KM)	328.3
80% gamma percentile (KM)	139.5	90% gamma percentile (KM)	274.8
95% gamma percentile (KM)	431.7	99% gamma percentile (KM)	842.7

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.76, α)	2.041	Adjusted Chi Square Value (6.76, β)	1.67
95% Gamma Approximate KM-UCL (use when n>=50)	306.5	95% Gamma Adjusted KM-UCL (use when n<50)	374.7

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	92.9	Mean in Log Scale	1.494
SD in Original Scale	175.7	SD in Log Scale	3.175
95% t UCL (assumes normality of ROS data)	184	95% Percentile Bootstrap UCL	180.3
95% BCA Bootstrap UCL	206.5	95% Bootstrap t UCL	398
95% H-UCL (Log ROS)	982283		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.513	KM Geo Mean	4.54
KM SD (logged)	2.783	95% Critical H Value (KM-Log)	6.702
KM Standard Error of Mean (logged)	0.898	95% H-UCL (KM -Log)	60533
KM SD (logged)	2.783	95% Critical H Value (KM-Log)	6.702
KM Standard Error of Mean (logged)	0.898		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	92.48	Mean in Log Scale	1.455
SD in Original Scale	175.9	SD in Log Scale	2.961
95% t UCL (Assumes normality)	183.7	95% H-Stat UCL	195372

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 190.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - trans-1,2-Dichloroethene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	10.3	Minimum Non-Detect	0.5
Maximum Detect	31.6	Maximum Non-Detect	0.5
Variance Detects	226.8	Percent Non-Detects	50%
Mean Detects	20.95	SD Detects	15.06
Median Detects	20.95	CV Detects	0.719
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.893	SD of Logged Detects	0.793

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use

guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	10.73	KM Standard Error of Mean	8.979
KM SD	12.7	95% KM (BCA) UCL	N/A
95% KM (t) UCL	31.86	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	25.49	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	37.66	95% KM Chebyshev UCL	49.87
97.5% KM Chebyshev UCL	66.8	99% KM Chebyshev UCL	100.1

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.503	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.981	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.01	nu star (bias corrected)	N/A
Mean (detects)	20.95		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10.73	SD (KM)	12.7
Variance (KM)	161.3	SE of Mean (KM)	8.979
k hat (KM)	0.713	k star (KM)	0.345
nu hat (KM)	5.706	nu star (KM)	2.76
theta hat (KM)	15.04	theta star (KM)	31.09
80% gamma percentile (KM)	16.94	90% gamma percentile (KM)	31.04
95% gamma percentile (KM)	46.86	99% gamma percentile (KM)	87.31

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (2.76, α)	0.305	Adjusted Chi Square Value (2.76, β)	0.0824
95% Gamma Approximate KM-UCL (use when n>=50)	97.05	95% Gamma Adjusted KM-UCL (use when n<50)	359.1

Parcel F - trans-1,2-Dichloroethene

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	11.04	Mean in Log Scale	1.432
SD in Original Scale	14.38	SD in Log Scale	1.806
95% t UCL (assumes normality of ROS data)	27.96	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	4986670		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.1	KM Geo Mean	3.003
KM SD (logged)	1.836	95% Critical H Value (KM-Log)	12.05
KM Standard Error of Mean (logged)	1.298	95% H-UCL (KM -Log)	5710940
KM SD (logged)	1.836	95% Critical H Value (KM-Log)	12.05
KM Standard Error of Mean (logged)	1.298		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10.6	Mean in Log Scale	0.753
SD in Original Scale	14.78	SD in Log Scale	2.512
95% t UCL (Assumes normality)	27.99	95% H-Stat UCL	1.120E+12

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 49.87

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Trichloroethene

General Statistics

Total Number of Observations	12	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	1.55	Minimum Non-Detect	1
Maximum Detect	510	Maximum Non-Detect	1
Variance Detects	33401	Percent Non-Detects	41.67%
Mean Detects	174.9	SD Detects	182.8
Median Detects	200	CV Detects	1.045
Skewness Detects	0.96	Kurtosis Detects	0.791
Mean of Logged Detects	3.983	SD of Logged Detects	2.247

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	102.5	KM Standard Error of Mean	48.36
KM SD	155.1	95% KM (BCA) UCL	181.7
95% KM (t) UCL	189.3	95% KM (Percentile Bootstrap) UCL	180.6
95% KM (z) UCL	182	95% KM Bootstrap t UCL	232.5
90% KM Chebyshev UCL	247.5	95% KM Chebyshev UCL	313.2
97.5% KM Chebyshev UCL	404.4	99% KM Chebyshev UCL	583.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.447	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.327	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.533	k star (bias corrected MLE)	0.4
Theta hat (MLE)	328.5	Theta star (bias corrected MLE)	437.8
nu hat (MLE)	7.455	nu star (bias corrected)	5.594
Mean (detects)	174.9		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	102
Maximum	510	Median	2.985
SD	162.3	CV	1.59
k hat (MLE)	0.178	k star (bias corrected MLE)	0.189
Theta hat (MLE)	574.6	Theta star (bias corrected MLE)	540.7
nu hat (MLE)	4.262	nu star (bias corrected)	4.53
Adjusted Level of Significance (β)	0.029		
Approximate Chi Square Value (4.53, α)	0.941	Adjusted Chi Square Value (4.53, β)	0.721
95% Gamma Approximate UCL (use when n>=50)	491	95% Gamma Adjusted UCL (use when n<50)	640.7

Parcel F - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	102.5	SD (KM)	155.1
Variance (KM)	24053	SE of Mean (KM)	48.36
k hat (KM)	0.436	k star (KM)	0.383
nu hat (KM)	10.47	nu star (KM)	9.189
theta hat (KM)	234.8	theta star (KM)	267.6
80% gamma percentile (KM)	164.5	90% gamma percentile (KM)	291.6
95% gamma percentile (KM)	432.2	99% gamma percentile (KM)	787.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.19, α)	3.441	Adjusted Chi Square Value (9.19, β)	2.926
95% Gamma Approximate KM-UCL (use when n>=50)	273.6	95% Gamma Adjusted KM-UCL (use when n<50)	321.8

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	102.2	Mean in Log Scale	1.59
SD in Original Scale	162.2	SD in Log Scale	3.533
95% t UCL (assumes normality of ROS data)	186.3	95% Percentile Bootstrap UCL	180.7
95% BCA Bootstrap UCL	202.1	95% Bootstrap t UCL	243.7
95% H-UCL (Log ROS)	19438461		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.323	KM Geo Mean	10.21
KM SD (logged)	2.526	95% Critical H Value (KM-Log)	6.125
KM Standard Error of Mean (logged)	0.788	95% H-UCL (KM -Log)	26311
KM SD (logged)	2.526	95% Critical H Value (KM-Log)	6.125
KM Standard Error of Mean (logged)	0.788		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	102.2	Mean in Log Scale	2.035
SD in Original Scale	162.1	SD in Log Scale	2.924
95% t UCL (Assumes normality)	186.3	95% H-Stat UCL	268195

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 189.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Vinyl chloride

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.024	Minimum Non-Detect	1
Maximum Detect	0.18	Maximum Non-Detect	2.5
Variance Detects	0.0122	Percent Non-Detects	50%
Mean Detects	0.102	SD Detects	0.11
Median Detects	0.102	CV Detects	1.081
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.722	SD of Logged Detects	1.425

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use

guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.

For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).

Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.102	KM Standard Error of Mean	0.078
KM SD	0.078	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.286	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.23	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.336	95% KM Chebyshev UCL	0.442
97.5% KM Chebyshev UCL	0.589	99% KM Chebyshev UCL	0.878

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.279	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0798	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.115	nu star (bias corrected)	N/A
Mean (detects)	0.102		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.102	SD (KM)	0.078
Variance (KM)	0.00608	SE of Mean (KM)	0.078
k hat (KM)	1.71	k star (KM)	0.594
nu hat (KM)	13.68	nu star (KM)	4.753
theta hat (KM)	0.0596	theta star (KM)	0.172
80% gamma percentile (KM)	0.168	90% gamma percentile (KM)	0.266
95% gamma percentile (KM)	0.368	99% gamma percentile (KM)	0.616

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (4.75, α)	1.04	Adjusted Chi Square Value (4.75, β)	0.372
95% Gamma Approximate KM-UCL (use when n>=50)	0.466	95% Gamma Adjusted KM-UCL (use when n<50)	1.302

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Parcel F - Vinyl chloride

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0839	Mean in Log Scale	-2.722
SD in Original Scale	0.067	SD in Log Scale	0.823
95% t UCL (assumes normality of ROS data)	0.163	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	1.289		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.722	KM Geo Mean	0.0657
KM SD (logged)	1.007	95% Critical H Value (KM-Log)	6.716
KM Standard Error of Mean (logged)	1.007	95% H-UCL (KM -Log)	5.429
KM SD (logged)	1.007	95% Critical H Value (KM-Log)	6.716
KM Standard Error of Mean (logged)	1.007		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.489	Mean in Log Scale	-1.479
SD in Original Scale	0.545	SD in Log Scale	1.697
95% t UCL (Assumes normality)	1.13	95% H-Stat UCL	52988

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.442

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/15/2022 4:19:16 PM
From File	x Input GW Plumes VI.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Parcel A - Tetrachloroethene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	12	Number of Non-Detects	4
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.863	Minimum Non-Detect	1
Maximum Detect	40000	Maximum Non-Detect	1
Variance Detects	1.308E+8	Percent Non-Detects	25%
Mean Detects	3734	SD Detects	11438
Median Detects	97.85	CV Detects	3.063
Skewness Detects	3.445	Kurtosis Detects	11.9
Mean of Logged Detects	4.933	SD of Logged Detects	2.921

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.367	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.484	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2801	KM Standard Error of Mean	2512
KM SD	9621	95% KM (BCA) UCL	7709
95% KM (t) UCL	7205	95% KM (Percentile Bootstrap) UCL	7698
95% KM (z) UCL	6933	95% KM Bootstrap t UCL	64263
90% KM Chebyshev UCL	10337	95% KM Chebyshev UCL	13751
97.5% KM Chebyshev UCL	18489	99% KM Chebyshev UCL	27797

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.17	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.862	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.299	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.271	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.22	k star (bias corrected MLE)	0.221
Theta hat (MLE)	16958	Theta star (bias corrected MLE)	16919
nu hat (MLE)	5.285	nu star (bias corrected)	5.297
Mean (detects)	3734		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2801
Maximum	40000	Median	75.65
SD	9937	CV	3.548

Parcel A - Tetrachloroethene

k hat (MLE)	0.144	k star (bias corrected MLE)	0.158
Theta hat (MLE)	19511	Theta star (bias corrected MLE)	17692
nu hat (MLE)	4.593	nu star (bias corrected)	5.065
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (5.07, α)	1.182	Adjusted Chi Square Value (5.07, β)	0.986
95% Gamma Approximate UCL (use when n>=50)	11997	95% Gamma Adjusted UCL (use when n<50)	14393

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2801	SD (KM)	9621
Variance (KM)	92564463	SE of Mean (KM)	2512
k hat (KM)	0.0847	k star (KM)	0.111
nu hat (KM)	2.712	nu star (KM)	3.537
theta hat (KM)	33050	theta star (KM)	25342
80% gamma percentile (KM)	2226	90% gamma percentile (KM)	7739
95% gamma percentile (KM)	16130	99% gamma percentile (KM)	42295

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.54, α)	0.548	Adjusted Chi Square Value (3.54, β)	0.435
95% Gamma Approximate KM-UCL (use when n>=50)	18085	95% Gamma Adjusted KM-UCL (use when n<50)	22757

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2801	Mean in Log Scale	3.54
SD in Original Scale	9937	SD in Log Scale	3.591
95% t UCL (assumes normality of ROS data)	7156	95% Percentile Bootstrap UCL	7709
95% BCA Bootstrap UCL	10324	95% Bootstrap t UCL	64277
95% H-UCL (Log ROS)	25178456		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.663	KM Geo Mean	38.99
KM SD (logged)	3.272	95% Critical H Value (KM-Log)	6.965
KM Standard Error of Mean (logged)	0.854	95% H-UCL (KM -Log)	2960635
KM SD (logged)	3.272	95% Critical H Value (KM-Log)	6.965
KM Standard Error of Mean (logged)	0.854		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2801	Mean in Log Scale	3.527
SD in Original Scale	9937	SD in Log Scale	3.548
95% t UCL (Assumes normality)	7155	95% H-Stat UCL	18069242

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	27797

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel A - Trichloroethene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	5
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	0.751	Minimum Non-Detect	1
Maximum Detect	46	Maximum Non-Detect	1
Variance Detects	309.8	Percent Non-Detects	31.25%
Mean Detects	17.8	SD Detects	17.6
Median Detects	13.5	CV Detects	0.989
Skewness Detects	0.518	Kurtosis Detects	-1.622
Mean of Logged Detects	2.03	SD of Logged Detects	1.642

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	12.5	KM Standard Error of Mean	4.191
KM SD	15.98	95% KM (BCA) UCL	19.15
95% KM (t) UCL	19.84	95% KM (Percentile Bootstrap) UCL	19.25
95% KM (z) UCL	19.39	95% KM Bootstrap t UCL	22.2
90% KM Chebyshev UCL	25.07	95% KM Chebyshev UCL	30.76
97.5% KM Chebyshev UCL	38.67	99% KM Chebyshev UCL	54.2

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.552	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.266	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.71	k star (bias corrected MLE)	0.577
Theta hat (MLE)	25.06	Theta star (bias corrected MLE)	30.83
nu hat (MLE)	15.63	nu star (bias corrected)	12.7
Mean (detects)	17.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	12.63
Maximum	46	Median	3.739
SD	16.44	CV	1.302
k hat (MLE)	0.385	k star (bias corrected MLE)	0.355
Theta hat (MLE)	32.76	Theta star (bias corrected MLE)	35.59
nu hat (MLE)	12.34	nu star (bias corrected)	11.36
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (11.36, α)	4.806	Adjusted Chi Square Value (11.36, β)	4.33
95% Gamma Approximate UCL (use when n>=50)	29.84	95% Gamma Adjusted UCL (use when n<50)	33.12

Parcel A - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	12.5	SD (KM)	15.98
Variance (KM)	255.5	SE of Mean (KM)	4.191
k hat (KM)	0.611	k star (KM)	0.538
nu hat (KM)	19.56	nu star (KM)	17.23
theta hat (KM)	20.44	theta star (KM)	23.21
80% gamma percentile (KM)	20.57	90% gamma percentile (KM)	33.29
95% gamma percentile (KM)	46.75	99% gamma percentile (KM)	79.65

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.23, α)	8.834	Adjusted Chi Square Value (17.23, β)	8.157
95% Gamma Approximate KM-UCL (use when n>=50)	24.37	95% Gamma Adjusted KM-UCL (use when n<50)	26.39

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	12.63	Mean in Log Scale	1.385
SD in Original Scale	16.41	SD in Log Scale	1.726
95% t UCL (assumes normality of ROS data)	19.82	95% Percentile Bootstrap UCL	19.5
95% BCA Bootstrap UCL	20.11	95% Bootstrap t UCL	21.83
95% H-UCL (Log ROS)	103.3		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.337	KM Geo Mean	3.806
KM SD (logged)	1.657	95% Critical H Value (KM-Log)	3.828
KM Standard Error of Mean (logged)	0.435	95% H-UCL (KM -Log)	77.25
KM SD (logged)	1.657	95% Critical H Value (KM-Log)	3.828
KM Standard Error of Mean (logged)	0.435		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	12.39	Mean in Log Scale	1.179
SD in Original Scale	16.59	SD in Log Scale	1.87
95% t UCL (Assumes normality)	19.66	95% H-Stat UCL	143.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	19.84

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel B - Trichloroethene

General Statistics

Total Number of Observations	3	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	2
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Parcel B - Trichloroethene was not processed!

Parcel C - Trichloroethene

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	0
Minimum	4.43	Mean	4.43
Maximum	4.43	Median	4.43

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Parcel C - Trichloroethene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Parcel D - Trichloroethene

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	1
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	8.1	Minimum Non-Detect	1
Maximum Detect	9.02	Maximum Non-Detect	1
Variance Detects	0.423	Percent Non-Detects	33.33%
Mean Detects	8.56	SD Detects	0.651
Median Detects	8.56	CV Detects	0.076
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.146	SD of Logged Detects	0.0761

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	6.04	KM Standard Error of Mean	2.926
KM SD	3.584	95% KM (BCA) UCL	N/A
95% KM (t) UCL	14.58	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	10.85	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	14.82	95% KM Chebyshev UCL	18.79
97.5% KM Chebyshev UCL	24.31	99% KM Chebyshev UCL	35.15

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	345.9	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0247	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1384	nu star (bias corrected)	N/A
Mean (detects)	8.56		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.04	SD (KM)	3.584
Variance (KM)	12.84	SE of Mean (KM)	2.926
k hat (KM)	2.841	k star (KM)	N/A
nu hat (KM)	17.04	nu star (KM)	N/A
theta hat (KM)	2.126	theta star (KM)	N/A
80% gamma percentile (KM)	N/A	90% gamma percentile (KM)	N/A
95% gamma percentile (KM)	N/A	99% gamma percentile (KM)	N/A

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00136
Approximate Chi Square Value (N/A, α)	N/A	Adjusted Chi Square Value (N/A, β)	N/A
95% Gamma Approximate KM-UCL (use when n>=50)	N/A	95% Gamma Adjusted KM-UCL (use when n<50)	N/A

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Parcel D - Trichloroethene

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7.938	Mean in Log Scale	2.064
SD in Original Scale	1.171	SD in Log Scale	0.151
95% t UCL (assumes normality of ROS data)	9.913	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	10.97		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.43	KM Geo Mean	4.181
KM SD (logged)	1.012	95% Critical H Value (KM-Log)	13.21
KM Standard Error of Mean (logged)	0.827	95% H-UCL (KM -Log)	89492
KM SD (logged)	1.012	95% Critical H Value (KM-Log)	13.21
KM Standard Error of Mean (logged)	0.827		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.873	Mean in Log Scale	1.199
SD in Original Scale	4.676	SD in Log Scale	1.64
95% t UCL (Assumes normality)	13.76	95% H-Stat UCL	7.879E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	14.58	KM H-UCL	89492
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel E - Trichloroethene

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
		Number of Missing Observations	0
Minimum	6.26	Mean	126
Maximum	291	Median	86.7
SD	127	Std. Error of Mean	51.83
Coefficient of Variation	1.008	Skewness	0.553

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	230.4	95% Adjusted-CLT UCL (Chen-1995)	223.7
		95% Modified-t UCL (Johnson-1978)	232.4

Gamma GOF Test

A-D Test Statistic	0.318	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.203	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.799	k star (bias corrected MLE)	0.511
Theta hat (MLE)	157.6	Theta star (bias corrected MLE)	246.6
nu hat (MLE)	9.591	nu star (bias corrected)	6.129
MLE Mean (bias corrected)	126	MLE Sd (bias corrected)	176.3
		Approximate Chi Square Value (0.05)	1.706
Adjusted Level of Significance	0.0122	Adjusted Chi Square Value	0.997

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	452.5	95% Adjusted Gamma UCL (use when n<50)	774.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.918	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.788	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.325	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.834	Mean of logged Data	4.093
Maximum of Logged Data	5.673	SD of logged Data	1.559

Parcel E - Trichloroethene

Assuming Lognormal Distribution

95% H-UCL	14101	90% Chebyshev (MVUE) UCL	409.8
95% Chebyshev (MVUE) UCL	528.7	97.5% Chebyshev (MVUE) UCL	693.8
99% Chebyshev (MVUE) UCL	1018		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	211.2	95% Jackknife UCL	230.4
95% Standard Bootstrap UCL	204.4	95% Bootstrap-t UCL	279.4
95% Hall's Bootstrap UCL	255.3	95% Percentile Bootstrap UCL	209.2
95% BCA Bootstrap UCL	214.9		
90% Chebyshev(Mean, Sd) UCL	281.5	95% Chebyshev(Mean, Sd) UCL	351.9
97.5% Chebyshev(Mean, Sd) UCL	449.7	99% Chebyshev(Mean, Sd) UCL	641.7

Suggested UCL to Use

95% Student's-t UCL	230.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Tetrachloroethene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	11.85	Minimum Non-Detect	0.5
Maximum Detect	460	Maximum Non-Detect	1
Variance Detects	49563	Percent Non-Detects	44.44%
Mean Detects	221.3	SD Detects	222.6
Median Detects	154	CV Detects	1.006
Skewness Detects	0.354	Kurtosis Detects	-3.096
Mean of Logged Detects	4.601	SD of Logged Detects	1.674

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.813	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.253	Lilliefors GOF Test
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	123.2	KM Standard Error of Mean	68.79
KM SD	184.6	95% KM (BCA) UCL	221.4
95% KM (t) UCL	251.1	95% KM (Percentile Bootstrap) UCL	227.4
95% KM (z) UCL	236.3	95% KM Bootstrap t UCL	363.7
90% KM Chebyshev UCL	329.5	95% KM Chebyshev UCL	423
97.5% KM Chebyshev UCL	552.7	99% KM Chebyshev UCL	807.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.423	Anderson-Darling GOF Test
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.367	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.75	k star (bias corrected MLE)	0.433
Theta hat (MLE)	295.1	Theta star (bias corrected MLE)	510.7
nu hat (MLE)	7.501	nu star (bias corrected)	4.334
Mean (detects)	221.3		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	123
Maximum	460	Median	11.85
SD	195.9	CV	1.593
k hat (MLE)	0.175	k star (bias corrected MLE)	0.191
Theta hat (MLE)	704	Theta star (bias corrected MLE)	645.4
nu hat (MLE)	3.144	nu star (bias corrected)	3.429
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (3.43, α)	0.51	Adjusted Chi Square Value (3.43, β)	0.329
95% Gamma Approximate UCL (use when n>=50)	826.5	95% Gamma Adjusted UCL (use when n<50)	1283

Parcel F - Tetrachloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	123.2	SD (KM)	184.6
Variance (KM)	34067	SE of Mean (KM)	68.79
k hat (KM)	0.445	k star (KM)	0.371
nu hat (KM)	8.016	nu star (KM)	6.677
theta hat (KM)	276.6	theta star (KM)	332
80% gamma percentile (KM)	196.8	90% gamma percentile (KM)	352.4
95% gamma percentile (KM)	525.2	99% gamma percentile (KM)	963.2

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.68, α)	1.995	Adjusted Chi Square Value (6.68, β)	1.502
95% Gamma Approximate KM-UCL (use when n>=50)	412.2	95% Gamma Adjusted KM-UCL (use when n<50)	547.6

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	123.6	Mean in Log Scale	2.539
SD in Original Scale	195.5	SD in Log Scale	2.791
95% t UCL (assumes normality of ROS data)	244.7	95% Percentile Bootstrap UCL	228.6
95% BCA Bootstrap UCL	255.7	95% Bootstrap t UCL	518.8
95% H-UCL (Log ROS)	1359324		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.248	KM Geo Mean	9.472
KM SD (logged)	2.858	95% Critical H Value (KM-Log)	7.97
KM Standard Error of Mean (logged)	1.065	95% H-UCL (KM -Log)	1766374
KM SD (logged)	2.858	95% Critical H Value (KM-Log)	7.97
KM Standard Error of Mean (logged)	1.065		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	123.1	Mean in Log Scale	2.171
SD in Original Scale	195.8	SD in Log Scale	3.123
95% t UCL (Assumes normality)	244.5	95% H-Stat UCL	16626006

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 251.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - trans-1,2-Dichloroethene

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	1
Minimum Detect	10.3	Minimum Non-Detect	0.5
Maximum Detect	31.6	Maximum Non-Detect	0.5
Variance Detects	226.8	Percent Non-Detects	50%
Mean Detects	20.95	SD Detects	15.06
Median Detects	20.95	CV Detects	0.719
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.893	SD of Logged Detects	0.793

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	10.73	KM Standard Error of Mean	8.979
KM SD	12.7	95% KM (BCA) UCL	N/A
95% KM (t) UCL	31.86	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	25.49	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	37.66	95% KM Chebyshev UCL	49.87
97.5% KM Chebyshev UCL	66.8	99% KM Chebyshev UCL	100.1

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.503	k star (bias corrected MLE)	N/A
Theta hat (MLE)	5.981	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.01	nu star (bias corrected)	N/A
Mean (detects)	20.95		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	10.73	SD (KM)	12.7
Variance (KM)	161.3	SE of Mean (KM)	8.979
k hat (KM)	0.713	k star (KM)	0.345
nu hat (KM)	5.706	nu star (KM)	2.76
theta hat (KM)	15.04	theta star (KM)	31.09
80% gamma percentile (KM)	16.94	90% gamma percentile (KM)	31.04
95% gamma percentile (KM)	46.86	99% gamma percentile (KM)	87.31

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (2.76, α)	0.305	Adjusted Chi Square Value (2.76, β)	0.0824
95% Gamma Approximate KM-UCL (use when n>=50)	97.05	95% Gamma Adjusted KM-UCL (use when n<50)	359.1

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	11.04	Mean in Log Scale	1.432
SD in Original Scale	14.38	SD in Log Scale	1.806
95% t UCL (assumes normality of ROS data)	27.96	95% Percentile Bootstrap UCL	N/A

Parcel F - trans-1,2-Dichloroethene

95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	4986670		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.1	KM Geo Mean	3.003
KM SD (logged)	1.836	95% Critical H Value (KM-Log)	12.05
KM Standard Error of Mean (logged)	1.298	95% H-UCL (KM -Log)	5710940
KM SD (logged)	1.836	95% Critical H Value (KM-Log)	12.05
KM Standard Error of Mean (logged)	1.298		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10.6	Mean in Log Scale	0.753
SD in Original Scale	14.78	SD in Log Scale	2.512
95% t UCL (Assumes normality)	27.99	95% H-Stat UCL	1.120E+12

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 49.87

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Trichloroethene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	2
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	1.55	Minimum Non-Detect	1
Maximum Detect	510	Maximum Non-Detect	1
Variance Detects	33401	Percent Non-Detects	22.22%
Mean Detects	174.9	SD Detects	182.8
Median Detects	200	CV Detects	1.045
Skewness Detects	0.96	Kurtosis Detects	0.791
Mean of Logged Detects	3.983	SD of Logged Detects	2.247

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	136.3	KM Standard Error of Mean	59.7
KM SD	165.8	95% KM (BCA) UCL	243.3
95% KM (t) UCL	247.3	95% KM (Percentile Bootstrap) UCL	231.9
95% KM (z) UCL	234.5	95% KM Bootstrap t UCL	285.6
90% KM Chebyshev UCL	315.4	95% KM Chebyshev UCL	396.5
97.5% KM Chebyshev UCL	509.1	99% KM Chebyshev UCL	730.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.447	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.283	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.327	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.533	k star (bias corrected MLE)	0.4
Theta hat (MLE)	328.5	Theta star (bias corrected MLE)	437.8
nu hat (MLE)	7.455	nu star (bias corrected)	5.594
Mean (detects)	174.9		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	136.1
Maximum	510	Median	32.5
SD	176.1	CV	1.294
k hat (MLE)	0.25	k star (bias corrected MLE)	0.241
Theta hat (MLE)	543.8	Theta star (bias corrected MLE)	564.8
nu hat (MLE)	4.504	nu star (bias corrected)	4.336
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (4.34, α)	0.859	Adjusted Chi Square Value (4.34, β)	0.585
95% Gamma Approximate UCL (use when n>=50)	687	95% Gamma Adjusted UCL (use when n<50)	1009

Parcel F - Trichloroethene

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	136.3	SD (KM)	165.8
Variance (KM)	27496	SE of Mean (KM)	59.7
k hat (KM)	0.675	k star (KM)	0.524
nu hat (KM)	12.16	nu star (KM)	9.438
theta hat (KM)	201.8	theta star (KM)	259.9
80% gamma percentile (KM)	224.2	90% gamma percentile (KM)	365
95% gamma percentile (KM)	514.7	99% gamma percentile (KM)	881.1

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.44, α)	3.594	Adjusted Chi Square Value (9.44, β)	2.875
95% Gamma Approximate KM-UCL (use when n>=50)	357.9	95% Gamma Adjusted KM-UCL (use when n<50)	447.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.861	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	136.1	Mean in Log Scale	2.82
SD in Original Scale	176	SD in Log Scale	3.037
95% t UCL (assumes normality of ROS data)	245.2	95% Percentile Bootstrap UCL	229.3
95% BCA Bootstrap UCL	255.7	95% Bootstrap t UCL	288.4
95% H-UCL (Log ROS)	14688357		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.098	KM Geo Mean	22.15
KM SD (logged)	2.471	95% Critical H Value (KM-Log)	6.945
KM Standard Error of Mean (logged)	0.89	95% H-UCL (KM -Log)	202690
KM SD (logged)	2.471	95% Critical H Value (KM-Log)	6.945
KM Standard Error of Mean (logged)	0.89		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	136.2	Mean in Log Scale	2.944
SD in Original Scale	176	SD in Log Scale	2.835
95% t UCL (Assumes normality)	245.2	95% H-Stat UCL	2931251

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL 247.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Parcel F - Vinyl chloride

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.024	Minimum Non-Detect	1
Maximum Detect	0.18	Maximum Non-Detect	2.5
Variance Detects	0.0122	Percent Non-Detects	50%
Mean Detects	0.102	SD Detects	0.11
Median Detects	0.102	CV Detects	1.081
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.722	SD of Logged Detects	1.425

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.102	KM Standard Error of Mean	0.078
KM SD	0.078	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.286	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.23	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.336	95% KM Chebyshev UCL	0.442
97.5% KM Chebyshev UCL	0.589	99% KM Chebyshev UCL	0.878

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.279	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0798	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.115	nu star (bias corrected)	N/A
Mean (detects)	0.102		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.102	SD (KM)	0.078
Variance (KM)	0.00608	SE of Mean (KM)	0.078
k hat (KM)	1.71	k star (KM)	0.594
nu hat (KM)	13.68	nu star (KM)	4.753
theta hat (KM)	0.0596	theta star (KM)	0.172
80% gamma percentile (KM)	0.168	90% gamma percentile (KM)	0.266
95% gamma percentile (KM)	0.368	99% gamma percentile (KM)	0.616

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (4.75, α)	1.04	Adjusted Chi Square Value (4.75, β)	0.372
95% Gamma Approximate KM-UCL (use when n>=50)	0.466	95% Gamma Adjusted KM-UCL (use when n<50)	1.302

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Parcel F - Vinyl chloride

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0839	Mean in Log Scale	-2.722
SD in Original Scale	0.067	SD in Log Scale	0.823
95% t UCL (assumes normality of ROS data)	0.163	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	1.289		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.722	KM Geo Mean	0.0657
KM SD (logged)	1.007	95% Critical H Value (KM-Log)	6.716
KM Standard Error of Mean (logged)	1.007	95% H-UCL (KM -Log)	5.429
KM SD (logged)	1.007	95% Critical H Value (KM-Log)	6.716
KM Standard Error of Mean (logged)	1.007		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.489	Mean in Log Scale	-1.479
SD in Original Scale	0.545	SD in Log Scale	1.697
95% t UCL (Assumes normality)	1.13	95% H-Stat UCL	52988

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.442

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX D

CHEMICALS OF SPECIFIC CONSIDERATION

(Provided on CD)

Table D-1
Calculation of Risks to Future Residents from Ingestion of Groundwater for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Ingestion

Age	ED [1,2] (years)	EF [2] (days/yr)	IRGW [3, 4] (L/day)	BW [3, 4] (kg)	AT-C (days) (70 years x 365 days/year)	Age-Dependent [4] Adjustment Factors
0 to 2 years	2	350	0.73	10	25550	10
2 to 6 years	4	350	0.76	17	25550	3
6 to 16 years	10	350	1.3	44	25550	3
16 to 26 years	10	350	2.2	80	25550	1
0 to 6 years (Child)	6	350	0.78	15	25550	NA
6 to 26 years (Adult)	20	350	2.5	80	25550	NA

DI = (CGW x [(CAF x $IFW_{res\text{-}adj}$) + (MAF x $IFWM_{res\text{-}adj}$)] /AT-C)

Where:

IFWres-adj = ED_c x EF_c x $IRGW_c$ x $1/BW_c$ + ED_a x EF_a x $IRGW_a$ x $1/BW_a$

IFWMres-adj = ($ED_{0\text{-}2}$ x $EF_{0\text{-}2}$ x $IRGW_{0\text{-}2}$ x $1/BW_{0\text{-}2}$ x 10) + ($ED_{2\text{-}6}$ x $EF_{2\text{-}6}$ x $IRGW_{2\text{-}6}$ x $1/BW_{2\text{-}6}$ x 3) + ($ED_{6\text{-}16}$ x $EF_{6\text{-}16}$ x $IRGW_{6\text{-}16}$ x $1/BW_{6\text{-}16}$ x 3) + ($ED_{16\text{-}26}$ x $EF_{16\text{-}26}$ x $IRGW_{16\text{-}26}$ x $1/BW_{16\text{-}26}$ x 1)

CAF = $SF_{\text{Non-Hodgkins and Liver}}$ / SF_{Adult} = 3.72E-2 $(mg/kg\text{-}day)^{-1}$ / 4.6E-2 $(mg/kg\text{-}day)^{-1}$ = 0.804

MAF = SF_{Kidney} / SF_{Adult} = 9.3E-3 $(mg/kg\text{-}day)^{-1}$ / 4.6E-2 $(mg/kg\text{-}day)^{-1}$ = 0.202

Risk = DI x SF

Chemical	CGW (mg/L)	IFWres-adj (L/kg)	IFWMres-adj (L/kg)	DI (0 to 26 years) (mg/kg-day)	SF $(mg/kg\text{-}day)^{-1}$	Risk (0 to 26 years)	Total Risk
Parcel A							
Trichloroethylene	1.79E-02	3.28E+02	1.11E+03	3.41E-04	4.60E-02	1.57E-05	1.57E-05
Parcel B							
Trichloroethylene	1.00E-02	3.28E+02	1.11E+03	1.91E-04	4.60E-02	8.77E-06	8.77E-06
Parcel C							
Trichloroethylene	4.43E-03	3.28E+02	1.11E+03	8.44E-05	4.60E-02	3.88E-06	3.88E-06
Parcel D							
Trichloroethylene	1.98E-02	3.28E+02	1.11E+03	3.77E-04	4.60E-02	1.73E-05	1.73E-05
Parcel E							
Trichloroethylene	1.45E-01	3.28E+02	1.11E+03	2.76E-03	4.60E-02	1.27E-04	1.27E-04
Parcel F							
Trichloroethylene	1.89E-01	3.28E+02	1.11E+03	3.61E-03	4.60E-02	1.66E-04	1.66E-04
Parcel H							
Trichloroethylene	1.98E-02	3.28E+02	1.11E+03	3.77E-04	4.60E-02	1.73E-05	1.73E-05

Table D-1
Calculation of Risks to Future Residents from Ingestion of Groundwater for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Ingestion

Where:

AT-C (days) = (70 [lifetime in years] x 365 days/year)
BW (kg) = Body Weight
CAF (unitless) = Carcinogenic Adjusted Factor
CGW (mg/L) = Concentration in groundwater
DI (mg/kg-day) = Daily Intake
ED (years) = Exposure Duration
EF (days/year) = Exposure Frequency
IFWres-adj (L/kg) = Resident Drinking Water Ingestion Rate (Age-Adjusted)
IFWMres-adj (L/kg) = Resident Mutagenic Drinking Water Ingestion Rate (Age-Adjusted)
IRGW (L/day) = Ingestion Rate, groundwater
MAF (unitless) = Mutagenic Adjusted Factor
SF $(mg/kg\text{-}day)^{-1}$ = Oral Slope Factor

Sources:

[1] USEPA, 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. March 2005.
[2] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.
[3] USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/ 600/ R-090/052F. September 2011.
[4] USEPA, 2021. Regional Screening Level User's Guide. November 2021.

Table D-2
Calculation of Risks to Future Residents from Dermal Contact with Groundwater for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Dermal Contact

Age	EV [1] (events/day)	EF [2] (days/yr)	ED [2, 3] (years)	SA [4,5] (cm^2)	BW [4, 5] (kg)	AT-C (days) (70 years x 365 days/year)	Age-Dependent [5] Adjustment Factors
0 to 2 years	1	350	2	4646	10	25550	10
2 to 6 years	1	350	4	7225	17	25550	3
6 to 16 years	1	350	10	13350	44	25550	3
16 to 26 years	1	350	10	19450	80	25550	1
0 to 6 years (Child)	1	350	6	6365	15	25550	NA
6 to 26 years (Adult)	1	350	20	19652	80	25550	NA

DAD = ([(CAF x DFWres-adj) + (MAF x DFWMres-adj)] /AT-C)

Where:

DFWres-adj = DA-Event$_c$ x EV$_c$ x ED$_c$ x EF$_c$ x SA$_c$ x 1/BW$_c$ + DA-Event$_a$ x EV$_a$ x ED$_a$ x EF$_a$ x SA$_a$ x 1/BW$_a$

DFWMres-adj = (DA-Event$_{0-2}$ x EV$_{0-2}$ x ED$_{0-2}$ x EF$_{0-2}$ x SA$_{0-2}$ x 1/BW$_{0-2}$ x 10) + (DA-Event$_{2-6}$ x EV$_{2-6}$ x ED$_{2-6}$ x EF$_{2-6}$ x SA$_{2-6}$ x 1/BW$_{2-6}$ x 3) +
(DA-Event$_{6-16}$ x EV$_{6-16}$ x ED$_{6-16}$ x EF$_{6-16}$ x SA$_{6-16}$ x 1/BW$_{6-16}$ x 3) + (DA-Event$_{16-26}$ x EV$_{16-26}$ x ED$_{16-26}$ x EF$_{16-26}$ x SA$_{16-26}$ x 1/BW$_{16-26}$ x 1)

CAF = SF$_{\text{Non-Hodgkins and Liver}}$ / SF$_{\text{Adult}}$ = 3.72E-2 (mg/kg-day)$^{-1}$ / 4.6E-2 (mg/kg-day)$^{-1}$ = 0.804

MAF = SF$_{\text{Kidney}}$ / $_{\text{SFAdult}}$ = 9.3E-3 (mg/kg-day)$^{-1}$ / 4.6E-2 (mg/kg-day)$^{-1}$ = 0.202

Risk = DAD x SF

Chemical	CGW (mg/L)	DA-Event [6] (0 to 2 years) (2 to 6 years) (mg/cm^2-event)	DA-Event [6] (6 to 16 years) (16 to 26 years) (mg/cm^2-event)	DA-Event [6] (0 to 6 years) (mg/cm^2-event)	DA-Event [6] (6 to 26 years) (mg/cm^2-event)	DFWres-adj (L/kg)	DFWMres-adj (L/kg)	DAD (mg/kg-day)	SF (mg/kg-day)$^{-1}$	Risk (0 to 26 years)	Total Risk
Parcel A											
Trichloroethylene	1.79E-02	3.21E-07	3.57E-07	3.21E-07	3.57E-07	9.01E-01	3.06E+00	5.25E-05	4.60E-02	2.42E-06	2.42E-06
Parcel B											
Trichloroethylene	1.00E-02	1.80E-07	2.06E-07	1.80E-07	2.06E-07	5.14E-01	1.74E+00	2.99E-05	4.60E-02	1.38E-06	1.38E-06
Parcel C											
Trichloroethylene	4.43E-03	7.96E-08	9.12E-08	7.96E-08	9.12E-08	2.28E-01	7.69E-01	1.32E-05	4.60E-02	6.09E-07	6.09E-07
Parcel D											
Trichloroethylene	1.98E-02	3.55E-07	4.07E-07	3.55E-07	4.07E-07	1.02E+00	3.43E+00	5.91E-05	4.60E-02	2.72E-06	2.72E-06
Parcel E											
Trichloroethylene	1.45E-01	2.60E-06	2.98E-06	2.60E-06	2.98E-06	7.45E+00	2.51E+01	4.33E-04	4.60E-02	1.99E-05	1.99E-05
Parcel F											
Trichloroethylene	1.89E-01	3.40E-06	3.90E-06	3.40E-06	3.90E-06	9.73E+00	3.29E+01	5.66E-04	4.60E-02	2.60E-05	2.60E-05
Parcel H											
Trichloroethylene	1.98E-02	3.55E-07	4.07E-07	3.55E-07	4.07E-07	1.02E+00	3.43E+00	5.91E-05	4.60E-02	2.72E-06	2.72E-06

Table D-2
Calculation of Risks to Future Residents from Dermal Contact with Groundwater for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Dermal Contact

Where:

AT-C (days) = (70 [lifetime in years] x 365 days/year)
BW (kg) = Body Weight
CAF (unitless) = Carcinogenic Adjusted Factor
CGW (mg/L) = Concentration in groundwater
DAD (mg/kg-day) = Dermally Absorbed Dose
DA-Event (mg/cm2-event) = Absorbed dose per event
DFWres-adj (L/kg) = Resident Water Dermal Contact Rate (Age-Adjusted)
DFWMres-adj (mg/kg) = Resident Mutagenic Water Dermal Contact Rate (Age-Adjusted)
ED (years) = Exposure Duration
EF (days/year) = Exposure Frequency
EV (events/day) = Event Frequency
MAF (unitless) = Mutagenic Adjusted Factor
SA (cm2) = Skin Surface Area available for contact
SF $(mg/kg\text{-}day)^{-1}$ = Dermal Slope Factor

Sources:

[1] USEPA, 2004. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final, July 2004.
[2] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.
[3] USEPA, 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. March 2005.
[4] USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/ 600/ R-090/052F. September 2011.
[5] USEPA, 2021. Regional Screening Level User's Guide. November 2021.
[6] DA-Event calculations are shown in Appendix C.

Table D-3
Calculation of Risks to Future Residents from Inhalation of Trichloroethylene while Showering with Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Showering

Age	ET [1] (hours/day)	EF [1] (days/yr)	ED [1,2] (years)	AT-C (hours) (70 years x 365 days/year x 24 hours/day)	Age-Dependent [3] Adjustment Factors
0 to 2 years	24	350	2	613200	10
2 to 6 years	24	350	4	613200	3
6 to 16 years	24	350	10	613200	3
16 to 26 years	24	350	10	613200	1
26 years	24	350	26	613200	NA

$EC = CA \times [(ET_{res} \times EF_{res} \times ED_{res} \times CAF_{res}) + (ET_{0\text{-}2} \times EF_{0\text{-}2} \times ED_{0\text{-}2} \times MAF \times 10) + (ET_{2\text{-}6} \times EF_{2\text{-}6} \times ED_{2\text{-}6} \times MAF \times 3) +$
$(ET_{6\text{-}16} \times EF_{6\text{-}16} \times ED_{6\text{-}16} \times MAF \times 3) + (ET_{16\text{-}26} \times EF_{16\text{-}26} \times ED_{16\text{-}26} \times MAF \times 1)] / AT\text{-}C$

Where:

$CAF = IUR_{\text{Non-Hodgkins and Liver}} / IUR_{Adult} = 3.1E\text{-}6\ (ug/m^3)^{-1} / 4.1E\text{-}6\ (ug/m^3)^{-1} = 0.756$
$MAF = IUR_{Kidney} / IUR_{Adult} = 1E\text{-}6\ (ug/m^3)^{-1} / 4.1E\text{-}6\ (ug/m^3)^{-1} = 0.244$

Risk (0 to 26 years) = EC x IUR

Risk (0 to 26 years) = EC x IUR	CA (ug/m3)	EC (0 to 26 years) (ug/m3)	IUR $(ug/m^3)^{-1}$	Risk (0 to 26 years)	Total Risk
Parcel A					
Trichloroethylene	8.94E+00	4.56E+00	4.10E-06	1.87E-05	1.87E-05
Parcel B					
Trichloroethylene	5.00E+00	2.55E+00	4.10E-06	1.05E-05	1.05E-05
Parcel C					
Trichloroethylene	2.22E+00	1.13E+00	4.10E-06	4.63E-06	4.63E-06
Parcel D					
Trichloroethylene	9.88E+00	5.04E+00	4.10E-06	2.07E-05	2.07E-05
Parcel E					
Trichloroethylene	7.24E+01	3.69E+01	4.10E-06	1.51E-04	1.51E-04
Parcel F					
Trichloroethylene	9.47E+01	4.83E+01	4.10E-06	1.98E-04	1.98E-04
Parcel H					
Trichloroethylene	9.88E+00	5.04E+00	4.10E-06	2.07E-05	2.07E-05

Table D-3
Calculation of Risks to Future Residents from Inhalation of Trichloroethylene while Showering with Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Showering

Where:

AT-C (hours) = (70 [lifetime in years] x 365 days/year x 24 hours/day)
CA (ug/m3) = Contaminant concentration in air (calculated using USEPA Andelman Model):
(CW mg/L x 0.5 L/m3 x 1000 ug/mg)
CAF (unitless) = Carcinogenic Adjusted Factor
EC (ug/m3) = Exposure concentration for estimating cancer risk

ED (years) = Exposure Duration
EF (days/year) = Exposure Frequency
ET (hours/day) = Exposure Time
IUR $(ug/m3)^{-1}$ = Inhalation Unit Risk
MAF (unitless) = Mutagenic Adjusted Factor

Sources:

[1] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.
[2] USEPA, 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. March 2005.
[3] USEPA, 2021. Regional Screening Level User's Guide. November 2021.

Table D-4
Calculation of Risks to Future Residents from Inhalation of VOCs via Vapor Intrusion for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Indoor Air

Age	ET [1] (hours/day)	EF [1] (days/yr)	ED [1,2] (years)	AT-C (hours) (70 years x 365 days/year x 24 hours/day)	Age-Dependent [3] Adjustment Factors
0 to 2 years	24	350	2	613200	10
2 to 6 years	24	350	4	613200	3
6 to 16 years	24	350	10	613200	3
16 to 26 years	24	350	10	613200	1
26 years	24	350	26	613200	NA

$EC = CA \times [(ET_{res} \times EF_{res} \times ED_{res} \times CAF_{res}) + (ET_{0\text{-}2} \times EF_{0\text{-}2} \times ED_{0\text{-}2} \times MAF \times 10) + (ET_{2\text{-}6} \times EF_{2\text{-}6} \times ED_{2\text{-}6} \times MAF \times 3) +$
$(ET_{6\text{-}16} \times EF_{6\text{-}16} \times ED_{6\text{-}16} \times MAF \times 3) + (ET_{16\text{-}26} \times EF_{16\text{-}26} \times ED_{16\text{-}26} \times MAF \times 1)] / AT\text{-}C$

Where:

$CAF = IUR_{\text{Non-Hodgkins and Liver}} / IUR_{\text{Adult}} = 3.1E\text{-}6\ (ug/m^3)^{-1} / 4.1E\text{-}6\ (ug/m^3)^{-1} = 0.756$
$MAF = IUR_{\text{Kidney}} / IUR_{\text{Adult}} = 1E\text{-}6\ (ug/m^3)^{-1} / 4.1E\text{-}6\ (ug/m^3)^{-1} = 0.244$

Risk (0 to 26 years) = EC x IUR

Chemical	CA (ug/m3)	EC (0 to 26 years) (ug/m3)	IUR $(ug/m^3)^{-1}$	Risk (0 to 26 years)	Total Risk
Parcel A					
Trichloroethene	1.34E+00	6.82E-01	4.10E-06	2.79E-06	2.79E-06
Parcel B					
Trichloroethene	6.74E-01	3.44E-01	4.10E-06	1.41E-06	1.41E-06
Parcel C					
Trichloroethene	2.98E-01	1.52E-01	4.10E-06	6.24E-07	6.24E-07
Parcel D					
Trichloroethene	6.08E-01	3.10E-01	4.10E-06	1.27E-06	1.27E-06
Parcel E					
Trichloroethene	1.61E+01	8.23E+00	4.10E-06	3.37E-05	3.37E-05
Parcel F					
Trichloroethene	1.77E+01	9.01E+00	4.10E-06	3.69E-05	3.69E-05
Parcel H					
Trichloroethene	6.08E-01	3.10E-01	4.10E-06	1.27E-06	1.27E-06

Table D-4
Calculation of Risks to Future Residents from Inhalation of VOCs via Vapor Intrusion for Trichloroethylene
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Indoor Air

Where:

AT-C (hours) = (70 [lifetime in years] x 365 days/year x 24 hours/day)
CA (ug/m3) = Contaminant concentration in air (calculated using Johnson and Ettinger Model)
CAF (unitless) = Carcinogenic Adjusted Factor
EC (ug/m3) = Exposure concentration for estimating cancer risk

ED (years) = Exposure Duration
EF (days/year) = Exposure Frequency
ET (hours/day) = Exposure Time
IUR $(ug/m3)^{-1}$ = Inhalation Unit Risk
MAF (unitless) = Mutagenic Adjusted Factor

Sources:

[1] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.
[2] USEPA, 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. March 2005.
[3] USEPA, 2021. Regional Screening Level User's Guide. November 2021.

Table D-5
Calculation of Risks to Future Residents from Ingestion of Groundwater for Vinyl Chloride
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Ingestion

Age	IRGW [1] (L/day)	EF [2] (days/yr)	ED [2] (years)	BW [1] (kg)	AT-C (days) (70 years x 365 days/year)
Early Life	0.78	NA	NA	15	NA
0 to 6 years	0.78	350	6	15	25550
6 to 26 years	2.5	350	20	80	25550

DI = (CGW x IRGWc x 1/BWc) + (CGW x IRGW c x EFc x EDc x 1/BWc x 1/AT-C) + (CGW x IRGWa x EFa x EDa x 1/BWa x 1/AT-C)

Risk (Early Life) = DI (Early Life) x SF_{EL}
Risk (0 to 6 years) = DI (0 to 6 years) x SF_{LL}
Risk (6 to 26 years) = DI (6 to 26 years) x SF_{LL}

Chemical	CGW (mg/L)	DI (Early Life) (mg/kg-day)	DI (0 to 6 years) (mg/kg-day)	DI (6 to 20 years) (mg/kg-day)	SF_{EL} (Early Life Risk) $(mg/kg\text{-}day)^{-1}$	SF_{LL} (Later Life Risk) $(mg/kg\text{-}day)^{-1}$	Risk (Early Life)	Risk (0 to 6 years)	Risk (6 to 26 years)	Total Risk
Parcel E										
Vinyl Chloride	3.40E-05	1.77E-06	1.45E-07	2.91E-07	7.80E-01	7.20E-01	1.38E-06	1.05E-07	2.10E-07	1.69E-06
Parcel F										
Vinyl Chloride	1.80E-04	9.36E-06	7.69E-07	1.54E-06	7.80E-01	7.20E-01	7.30E-06	5.54E-07	1.11E-06	8.96E-06

Where:

AT-C (days) = (70 [lifetime in years] x 365 days/year)
CGW (mg/L) = Concentration in groundwater
BWa (kg) = Body Weight - adult
BWc (kg) = Body Weight - child
DI (mg/kg-day) = Daily Intake

EDa (years) = Exposure Duration - adult
EDc (years) = Exposure Duration - child
EFa (days/year) = Exposure Frequency - adult
EFc (days/year) = Exposure Frequency - child

IRGWa (L/day) = Ingestion Rate, groundwater - adult
IRGWc (L/day) = Ingestion Rate, groundwater - child
NA = Not Applicable
SF_{EL} $(mg/kg\text{-}day)^{-1}$ = Oral Slope Factor for Early Lifetime Exposure
SF_{LL} $(mg/kg\text{-}day)^{-1}$ = Oral Slope Factor for Later Lifetime Exposure

SF_{EL} = SF for Lifetime exposure from birth - SF for Lifetime exposure during adulthood
= 1.5 $(mg/kg\text{-}day)^{-1}$ - 0.72 $(mg/kg\text{-}day)^{-1}$ = 0.78 $(mg/kg\text{-}day)^{-1}$

Sources:

[1] USEPA, 2021. Regional Screening Level User's Guide. November 2021.
[2] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.

Table D-6
Calculation of Risks to Future Residents from Dermal Contact with Groundwater for Vinyl Chloride
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Route:	Dermal Contact

Age	EV [1] (events/day)	EF [2] (days/yr)	ED [2] (years)	SA [3,4] (cm^2)	BW [3,4] (kg)	AT-C (days) (70 years x 365 days/year)
Early Life	1	NA	NA	4646	10	NA
0 to 6 years	1	350	6	6365	15	25550
6 to 26 years	1	350	20	19652	80	25550

DAD (Early Life) = DA-Event x EVc x SAc x 1/BWc
DAD (0 to 6 years) = DA-Event x EVc x EFc x EDc x SAc x 1/BWc x 1/AT-C
DAD (6 to 26 years) = DA-Event x EVa x EFa x EDa x SAa x 1/BWa x 1/AT-C

Risk (Early Life) = DAD (Early Life) x SF_{EL}
Risk (0 to 6 years) = DAD (0 to 6 years) x SF_{LL}
Risk (6 to 26 years) = DAD (6 to 26 years) x SF_{LL}

Chemical	CGW (mg/L)	DA-Event [5] (Early Life) (mg/cm^2-event)	DA-Event [5] (0 to 6 years) (mg/cm^2-event)	DA-Event [5] (6 to 26 years) (mg/cm^2-event)	DAD (Early Life) (mg/kg-day)	DAD (0 to 6 years) (mg/kg-day)	DAD (6 to 20 years) (mg/kg-day)	SF_{EL} (Early Life Risk) $(mg/kg\text{-}day)^{-1}$	SF_{LL} (Later Life Risk) $(mg/kg\text{-}day)^{-1}$	Risk (Early Life)	Risk (0 to 6 years)	Risk (6 to 26 years)	Total Risk
Parcel E													
Vinyl Chloride	3.40E-05	1.50E-09	1.50E-09	1.78E-09	6.95E-07	5.22E-08	1.20E-07	7.80E-01	7.20E-01	5.42E-07	3.76E-08	8.64E-08	6.66E-07
Parcel F													
Vinyl Chloride	1.80E-04	1.50E-09	1.50E-09	1.78E-09	6.95E-07	5.22E-08	1.20E-07	7.80E-01	7.20E-01	5.42E-07	3.76E-08	8.64E-08	6.66E-07

Where:

AT-C (days) = (70 [lifetime in years] x 365 days/year)
BWa (kg) = Body Weight - adult
BWc (kg) = Body Weight - child
CGW (mg/L) = Concentration in groundwater
DAD (mg/kg-day) = Dermally Absorbed Dose
DA-Event (mg/cm2-event) = Absorbed dose per event
EDa (years) = Exposure Duration - adult
EDc (years) = Exposure Duration - child
EFa (days/year) = Exposure Frequency - adult
EFc (days/year) = Exposure Frequency - child
EVa (events/day) = Event Frequency - adult
EVc (events/day) = Event Frequency - child
NA = Not Applicable
SAa (cm2) = Skin Surface Area available for contact - adult
SAc (cm2) = Skin Surface Area available for contact - child
SF_{EL} $(mg/kg\text{-}day)^{-1}$ = Dermal Slope Factor for Early Lifetime Exposure
SF_{LL} $(mg/kg\text{-}day)^{-1}$ = Dermal Slope Factor for Later Lifetime Exposure

SF_{EL} = SF for Lifetime exposure from birth - SF for Lifetime exposure during adulthood
= 1.5 $(mg/kg\text{-}day)^{-1}$ - 0.72 $(mg/kg\text{-}day)^{-1}$ = 0.78 $(mg/kg\text{-}day)^{-1}$

Sources:
[1] USEPA, 2004. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final, July 2004.
[2] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.
[3] USEPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/ 600/ R-090/052F. September 2011.
[4] USEPA, 2021. Regional Screening Level User's Guide. November 2021.
[5] DA-Event calculations are shown in Appendix C.

Table D-7
Calculation of Risks to Future Residents from Inhalation of Vinyl Chloride while Showering with Groundwater
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Showering

Age	ET [1] (hours/day)	EF [1] (days/yr)	ED [1] (years)	AT-C (hours) (70 years x 365 days/year x 24 hours/day)
Early Life	NA	NA	NA	NA
0 to 26 years	24	350	26	613200

EC (Early Life) = CA
EC (0 to 26 years) = (CA x ET x EF x ED) / AT-C

Risk (Early Life) = EC (Early Life) x IUR_{EL}
Risk (0 to 26 years) = EC (0 to 26 years) x IUR_{LL}

Chemical	CA (ug/m3)	EC (Early Life) (ug/m3)	EC (0 to 26 years) (ug/m3)	IUR_{EL} (Early Life Risk) $(ug/m^3)^{-1}$	IUR_{LL} (Later Life Risk) $(ug/m^3)^{-1}$	Risk (Early Life)	Risk (0 to 26 years)	Total Risk
Parcel E								
Vinyl Chloride	1.70E-02	1.70E-02	6.05E-03	4.40E-06	4.40E-06	7.48E-08	2.66E-08	1.01E-07
Parcel F								
Vinyl Chloride	9.00E-02	9.00E-02	3.21E-02	4.40E-06	4.40E-06	3.96E-07	1.41E-07	5.37E-07

Where:

AT-C (hours) = (70 [lifetime in years] x 365 days/year x 24 hours/day)
CA (ug/m3) = Contaminant concentration in air (calculated using USEPA Andelman Model):
(CW mg/L x 0.5 L/m3 x 1000 ug/mg)
EC (ug/m3) = Exposure concentration for estimating cancer risk

ED (years) = Exposure Duration
EF (days/year) = Exposure Frequency
IUR_{EL} $(ug/m3)^{-1}$ = Inhalation Unit Risk for Early Lifetime Exposure
IUR_{LL} $(ug/m3)^{-1}$ = Inhalation Unit Risk for Later Lifetime Exposure

IUR_{EL} = IUR for Lifetime exposure from birth - IUR for Lifetime exposure during adulthood
$= 8.8E\text{-}6\ (ug/m^3)^{-1} - 4.4E\text{-}6\ (ug/m^3)^{-1} = 4.4E\text{-}6\ (ug/m^3)^{-1}$

Sources:

[1] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.

Table D-8
Calculation of Risks to Future Residents from Inhalation of Vinyl Chloride via Vapor Intrusion
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe:	Future
Receptor Population:	Resident
Receptor Age:	26-year Resident (Adult/Child)

Medium:	Groundwater
Exposure Medium:	Air
Exposure Route:	Inhalation - Indoor Air

Age	ET [1] (hours/day)	EF [1] (days/yr)	ED [1] (years)	AT-C (hours) (70 years x 365 days/year x 24 hours/day)
Early Life	NA	NA	NA	NA
0 to 26 years	24	350	26	613200

EC (Early Life) = CA
EC (0 to 26 years) = (CA x ET x EF x ED) / AT-C

Risk (Early Life) = EC (Early Life) x IUR_{EL}
Risk (0 to 26 years) = EC (0 to 26 years) x IUR_{LL}

Chemical	CA (ug/m3)	EC (Early Life) (ug/m3)	EC (0 to 26 years) (ug/m3)	IUR_{EL} (Early Life Risk) $(ug/m^3)^{-1}$	IUR_{LL} (Later Life Risk) $(ug/m^3)^{-1}$	Risk (Early Life)	Risk (Later Life)	Total Risk
Parcel E								
Vinyl Chloride	5.81E-02	5.81E-02	2.07E-02	4.40E-06	4.40E-06	2.56E-07	9.11E-08	3.47E-07
Parcel F								
Vinyl Chloride	5.81E-02	5.81E-02	2.07E-02	4.40E-06	4.40E-06	2.56E-07	9.11E-08	3.47E-07

Where:

AT-C (hours) = (70 [lifetime in years] x 365 days/year x 24 hours/day)
CA (ug/m3) = Contaminant concentration in air (calculated using Johnson and Ettinger Model)
EC (ug/m3) = Exposure concentration for estimating cancer risk
ED (years) = Exposure Duration

EF (days/year) = Exposure Frequency
ET (hours/day) = Exposure Time
IUR_{EL} $(ug/m3)^{-1}$ = Inhalation Unit Risk for Early Lifetime Exposure
IUR_{LL} $(ug/m3)^{-1}$ = Inhalation Unit Risk for Later Lifetime Exposure

IUR_{EL} = IUR for Lifetime exposure from birth - IUR for Lifetime exposure during adulthood
= 8.8E-6 $(ug/m^3)^{-1}$ - 4.4E-6 $(ug/m^3)^{-1}$ = 4.4E-6 $(ug/m^3)^{-1}$

Sources:

[1] USEPA, 2014. OSWER Directive 9200.1-120. April 2014.

APPENDIX E

RISK AND HAZARD TABLES

(Provided on CD)

Table E-1
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Current / Future Trespasser (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Current / Future
Receptor Population: Trespasser
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	2.9E-05	mg/kg-day	2.1E-03	kg-day/mg	6E-08	2.0E-04	mg/kg-day	6.0E-03	mg/kg-day	0.03
			Exp. Route Total								6E-08					0.03
			Dermal	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									6E-08					0.03
	Exposure Medium Total										6E-08					0.03
	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	1.40E+02	ug/m3	4.6E-01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	1E-07	3.2E+00	ug/m3	4.0E+01	ug/m3	0.08
			Exp. Route Total								1E-07					0.08
		Exposure Point Total									1E-07					0.08
	Exposure Medium Total										1E-07					0.08
Surface Soil Total											2E-07					0.1
Total Receptor Risk										Total of Receptor Risks Across Surface Soil	2E-07				Total of Receptor Hazards Across SS	0.1

NA - Not Applicable.

Table E-2
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer: Intake/Exposure Concentration Value	Cancer: Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer: Intake/Exposure Concentration Value	Noncancer: Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	1.3E-05	mg/kg-day	2.1E-03	kg-day/mg	3E-08	9.3E-04	mg/kg-day	8.0E-03	mg/kg-day	0.1
			Exp. Route Total								3E-08					0.1
			Dermal	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									3E-08					0.1
	Exposure Medium Total										3E-08					0.1
	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	6.46E+02	ug/m3	2.1E+00	ug/m3	2.6E-07	$(ug/m3)^{-1}$	5E-07	1.5E+02	ug/m3	4.1E+01	ug/m3	4
			Exp. Route Total								5E-07					4
		Exposure Point Total									5E-07					4
	Exposure Medium Total										5E-07					4
Surface Soil Total											6E-07					4
Subsurface Soil	Subsurface Soil	Subsurface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	8.4E-07	mg/kg-day	2.1E-03	kg-day/mg	2E-09	5.9E-05	mg/kg-day	8.0E-03	mg/kg-day	0.007
			Exp. Route Total								2E-09					0.007
			Dermal	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									2E-09					0.007
	Exposure Medium Total										2E-09					0.007

Table E-2
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

							Cancer Risk Calculations					Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Concern	Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Subsurface Soil	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	4.08E+01	ug/m3	1.3E-01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	3E-08	9.3E+00	ug/m3	4.1E+01	ug/m3	0.2
			Exp. Route Total								3E-08					0.2
		Exposure Point Total									3E-08					0.2
	Exposure Medium Total										3E-08					0.2
Subsurface Soil Total											4E-08					0.2
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	3.0E-05	mg/kg-day	2.1E-03	kg-day/mg	6E-08	2.1E-03	mg/kg-day	8.0E-03	mg/kg-day	0.3
				Trichloroethylene	1.79E-02	mg/L	4.4E-08	mg/kg-day	4.6E-02	kg-day/mg	2E-09	3.1E-06	mg/kg-day	5.0E-04	mg/kg-day	0.006
			Exp. Route Total								6E-08					0.3
			Dermal	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	9.8E-04	mg/kg-day	2.1E-03	kg-day/mg	2E-06	6.8E-02	mg/kg-day	8.0E-03	mg/kg-day	9
				Trichloroethylene	1.79E-02	mg/L	4.5E-07	mg/kg-day	4.6E-02	kg-day/mg	2E-08	3.1E-05	mg/kg-day	5.0E-04	mg/kg-day	0.06
			Exp. Route Total								2E-06					9
		Exposure Point Total									2E-06					9
	Exposure Medium Total										2E-06					9
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	***VOCs***												
				Tetrachloroethene	7.91E+04	ug/m3	1.29E+02	ug/m3	2.6E-07	$(ug/m3)^{-1}$	3E-05	9.0E+03	ug/m3	4.1E+01	ug/m3	220
				Trichloroethylene	1.29E+02	ug/m3	2.11E-01	ug/m3	4.1E-06	$(ug/m3)^{-1}$	9E-07	1.5E+01	ug/m3	2.2E+00	ug/m3	7
			Exp. Route Total								3E-05					227
		Exposure Point Total									3E-05					227
	Exposure Medium Total										3E-05					227
Groundwater Total											4E-05					236
Total Receptor Risk							Total of Receptor Risks Across Surface Soil, Subsurface Soil, and Groundwater				4E-05	Total of Receptor Hazards Across SS, SSS, and GW				240

NA - Not Applicable.

Table E-3
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	5.0E-05	mg/kg-day	2.1E-03	kg-day/mg	1E-07	1.4E-04	mg/kg-day	6.0E-03	mg/kg-day	0.02
			Exp. Route Total								1E-07					0.02
			Dermal	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									1E-07					0.02
	Exposure Medium Total										1E-07					0.02
	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	1.40E+02	ug/m3	1.1E+01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	3E-06	3.2E+01	ug/m3	4.0E+01	ug/m3	0.8
			Exp. Route Total								3E-06					0.8
		Exposure Point Total									3E-06					0.8
	Exposure Medium Total										3E-06					0.8
Surface Soil Total											3E-06					0.8
Subsurface Soil	Subsurface Soil	Subsurface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	3.2E-06	mg/kg-day	2.1E-03	kg-day/mg	7E-09	8.9E-06	mg/kg-day	6.0E-03	mg/kg-day	0.001
			Exp. Route Total								7E-09					0.001
			Dermal	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									7E-09					0.001
	Exposure Medium Total										7E-09					0.001
Subsurface Soil Total											7E-09					0.001

Table E-3
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	3.7E-02	mg/kg-day	2.1E-03	kg-day/mg	8E-05	1.0E-01	mg/kg-day	6.0E-03	mg/kg-day	17
				Trichloroethylene	1.79E-02	mg/L	5.5E-05	mg/kg-day	4.6E-02	kg-day/mg	3E-06	1.5E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
			Exp. Route Total								8E-05					18
			Dermal	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	2.6E-03	mg/kg-day	2.1E-03	kg-day/mg	6E-06	7.4E-03	mg/kg-day	6.0E-03	mg/kg-day	1
				Trichloroethylene	1.79E-02	mg/L	1.1E-06	mg/kg-day	4.6E-02	kg-day/mg	5E-08	3.0E-06	mg/kg-day	5.0E-04	mg/kg-day	0.006
			Exp. Route Total								6E-06					1
		Exposure Point Total									9E-05					19
	Exposure Medium Total										9E-05					19
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Tetrachloroethene	3.05E+02	ug/m3	2.49E+01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	6E-06	7.0E+01	ug/m3	4.0E+01	ug/m3	2
				Trichloroethylene	3.42E-01	ug/m3	2.79E-02	ug/m3	4.1E-06	$(ug/m3)^{-1}$	1E-07	7.8E-02	ug/m3	2.0E+00	ug/m3	0.04
			Exp. Route Total								7E-06					2
		Exposure Point Total									7E-06					2
	Exposure Medium Total										7E-06					2
Groundwater Total											9E-05					21
Total Receptor Risk							Total of Receptor Risks Across Surface Soil, Subsurface Soil, and Groundwater				1E-04	Total of Receptor Hazards Across SS, SSS, and GW				22

NA - Not Applicable.

Table E-4

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel A)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Cancer Risk Calculations: Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Noncancer Hazard Calculations: Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	4.7E-04	mg/kg-day	2.1E-03	kg-day/mg	1E-06	3.9E-04	mg/kg-day	6.0E-03	mg/kg-day	0.07
			Exp. Route Total								1E-06					0.07
			Dermal	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									1E-06					0.07
	Exposure Medium Total										1E-06					0.07
	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	1.40E+02	ug/m3	5.0E+01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	1E-05	1.3E+02	ug/m3	4.0E+01	ug/m3	3
			Exp. Route Total								1E-05					3.4
		Exposure Point Total									1E-05					3
	Exposure Medium Total										1E-05					3
Surface Soil Total											1E-05					3
Subsurface Soil	Subsurface Soil	Subsurface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	3.0E-05	mg/kg-day	2.1E-03	kg-day/mg	6E-08	2.5E-05	mg/kg-day	6.0E-03	mg/kg-day	0.004
			Exp. Route Total								6E-08					0.004
			Dermal	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									6E-08					0.004
	Exposure Medium Total										6E-08					0.004
Subsurface Soil Total											6E-08					0.004

Table E-4
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	1.6E-01	mg/kg-day	2.1E-03	kg-day/mg	3E-04	3.7E-01	mg/kg-day	6.0E-03	mg/kg-day	61
				Trichloroethylene	1.79E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-05	5.4E-04	mg/kg-day	5.0E-04	mg/kg-day	1
			Exp. Route Total								3E-04					62
			Dermal	***VOCs***												
				Tetrachloroethene	1.22E+01	mg/L	9.0E-02	mg/kg-day	2.1E-03	kg-day/mg	2E-04	2.1E-01	mg/kg-day	6.0E-03	mg/kg-day	35
				Trichloroethylene	1.79E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-06	8.4E-05	mg/kg-day	5.0E-04	mg/kg-day	0.2
			Exp. Route Total								2E-04					35
		Exposure Point Total									5E-04					97
	Exposure Medium Total										5E-04					97
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation	***VOCs***												
				Tetrachloroethene	6.12E+03	ug/m3	6.45E+01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	2E-05	1.7E+02	ug/m3	4.0E+01	ug/m3	4
				Trichloroethylene	8.94E+00	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	2E-05	2.5E-01	ug/m3	2.0E+00	ug/m3	0.1
			Exp. Route Total								4E-05					4
		Exposure Point Total									4E-05					4
		Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Tetrachloroethene	1.21E+03	ug/m3	4.31E+02	ug/m3	2.6E-07	$(ug/m3)^{-1}$	1E-04	1.2E+03	ug/m3	4.0E+01	ug/m3	29
				Trichloroethylene	1.34E+00	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	3E-06	1.3E+00	ug/m3	2.0E+00	ug/m3	0.6
			Exp. Route Total								1E-04					30
		Exposure Point Total									1E-04					30
	Exposure Medium Total										2E-04					34
Groundwater Total											7E-04					131
Total Receptor Risk							Total of Receptor Risks Across Surface Soil, Subsurface Soil, and Groundwater				7E-04	Total of Receptor Hazards Across SS, SSS, and GW				134

(1) Refer to Appendix D for the risk estimates for trichloroethylene.

NA - Not Applicable.

Table E-5
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Surface Soil	Surface Soil	Surface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	4.2E-03	mg/kg-day	6.0E-03	mg/kg-day	0.7
			Exp. Route Total								NA					0.7
			Dermal	***VOCs***												
				Tetrachloroethene	3.29E+02	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									NA					0.7
	Exposure Medium Total										NA					0.7
	Air	Volatiles at Parcel A	Inhalation	***VOCs***												
				Tetrachloroethene	1.40E+02	ug/m3	NA	NA	NA	NA	NA	1.3E+02	ug/m3	4.0E+01	ug/m3	3
			Exp. Route Total								NA					3.36
		Exposure Point Total									NA					3.36
	Exposure Medium Total										NA					3.36
Surface Soil Total											NA					4
Subsurface Soil	Subsurface Soil	Subsurface Soil at Parcel A	Ingestion	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	NA	NA	NA	NA	NA	2.7E-04	mg/kg-day	6.0E-03	mg/kg-day	0.04
			Exp. Route Total								NA					0.04
			Dermal	***VOCs***												
				Tetrachloroethene	2.08E+01	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			Exp. Route Total								NA					NA
		Exposure Point Total									NA					0.04
	Exposure Medium Total										NA					0.04
Subsurface Soil Total											NA					0.04

Table E-5
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel A)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				Tetrachloroethene	1.22E+01	mg/L	NA	NA	NA	NA	NA	6.1E-01	mg/kg-day	6.0E-03	mg/kg-day	102
				Trichloroethylene	1.79E-02	mg/L	NA	NA	NA	NA	NA	8.9E-04	mg/kg-day	5.0E-04	mg/kg-day	2
			Exp. Route Total								NA					103
			Dermal													
				VOCs												
				Tetrachloroethene	1.22E+01	mg/L	NA	NA	NA	NA	NA	3.2E-01	mg/kg-day	6.0E-03	mg/kg-day	54
				Trichloroethylene	1.79E-02	mg/L	NA	NA	NA	NA	NA	1.3E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
			Exp. Route Total								NA					54
		Exposure Point Total									NA					157
	Exposure Medium Total										NA					157
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Tetrachloroethene	1.21E+03	ug/m3	NA	NA	NA	NA	NA	1.2E+03	ug/m3	4.0E+01	ug/m3	29
				Trichloroethylene	1.34E+00	ug/m3	NA	NA	NA	NA	NA	1.3E+00	ug/m3	2.0E+00	ug/m3	0.6
			Exp. Route Total								NA					30
		Exposure Point Total									NA					30
	Exposure Medium Total										NA					30
Groundwater Total											NA					187
Total Receptor Risk							Total of Receptor Risks Across Surface Soil, Subsurface Soil, and Groundwater				NA	Total of Receptor Hazards Across SS, SSS, and GW				191

NA - Not Applicable.

Table E-6
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel B)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	*VOCs* Trichloroethylene	1.00E-02	mg/L	2.5E-08	mg/kg-day	4.6E-02	kg-day/mg	1E-09	1.7E-06	mg/kg-day	5.0E-04	mg/kg-day	0.003
			Exp. Route Total								1E-09					0.003
			Dermal	*VOCs* Trichloroethylene	1.00E-02	mg/L	2.5E-07	mg/kg-day	4.6E-02	kg-day/mg	1E-08	1.8E-05	mg/kg-day	5.0E-04	mg/kg-day	0.04
			Exp. Route Total								1E-08					0.04
		Exposure Point Total									1E-08					0.04
	Exposure Medium Total										1E-08					0.04
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	*VOCs* Trichloroethylene	7.24E+01	ug/m3	1.18E-01	ug/m3	4.1E-06	$(ug/m3)^{-1}$	5E-07	8.3E+00	ug/m3	2.2E+00	ug/m3	4
			Exp. Route Total								5E-07					4
		Exposure Point Total									5E-07					4
	Exposure Medium Total										5E-07					4
Groundwater Total											5E-07					4
Total Receptor Risk										Total of Receptor Risks Across Groundwater	5E-07				Total of Receptor Hazards Across GW	4

NA - Not Applicable.

Table E-7

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel B)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

							Cancer Risk Calculations					Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Concern	Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	3.1E-05	mg/kg-day	4.6E-02	kg-day/mg	1E-06	8.6E-05	mg/kg-day	5.0E-04	mg/kg-day	0.2
			Exp. Route Total								1E-06					0.2
			Dermal	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	6.0E-07	mg/kg-day	4.6E-02	kg-day/mg	3E-08	1.7E-06	mg/kg-day	5.0E-04	mg/kg-day	0.003
			Exp. Route Total								3E-08					0.003
		Exposure Point Total									1E-06					0.2
	Exposure Medium Total										1E-06					0.2
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	1.72E-01	ug/m3	1.40E-02	ug/m3	4.1E-06	$(ug/m3)^{-1}$	6E-08	3.9E-02	ug/m3	2.0E+00	ug/m3	0.02
			Exp. Route Total								6E-08					0.02
		Exposure Point Total									6E-08					0.02
	Exposure Medium Total										6E-08					0.02
Groundwater Total											1E-06					0.2
Total Receptor Risk										Total of Receptor Risks Across Groundwater	1E-06				Total of Receptor Hazards Across GW	0.2

NA - Not Applicable.

Table E-8
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel B)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	9E-06	3.0E-04	mg/kg-day	5.0E-04	mg/kg-day	0.6
			Exp. Route Total								9E-06					0.6
			Dermal	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	1E-06	4.7E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
			Exp. Route Total								1E-06					0.1
		Exposure Point Total									1E-05					0.7
	Exposure Medium Total										1E-05					0.7
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation	***VOCs***												
				Trichloroethylene	5.00E+00	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	1E-05	1.4E-01	ug/m3	2.0E+00	ug/m3	0.07
			Exp. Route Total								1E-05					0.07
		Exposure Point Total									1E-05					0.07
		Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.74E-01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	1E-06	6.5E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								1E-06					0.3
		Exposure Point Total									1E-06					0.3
	Exposure Medium Total										1E-05					0.4
Groundwater Total											2E-05					1
Total Receptor Risk								Total of Receptor Risks Across Groundwater			2E-05			Total of Receptor Hazards Across GW		1

(1) Refer to Appendix D for the risk estimates for trichloroethylene.

Table E-9

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel B)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	NA	NA	NA	NA	NA	5.0E-04	mg/kg-day	5.0E-04	mg/kg-day	1
			Exp. Route Total								NA					1
			Dermal	***VOCs***												
				Trichloroethylene	1.00E-02	mg/L	NA	NA	NA	NA	NA	7.3E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
			Exp. Route Total								NA					0.1
		Exposure Point Total									NA					1
	Exposure Medium Total										NA					1
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.74E-01	ug/m3	NA	NA	NA	NA	NA	6.5E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								NA					0.3
		Exposure Point Total									NA					0.3
	Exposure Medium Total										NA					0.3
Groundwater Total											NA					1
Total Receptor Risk										Total of Receptor Risks Across Groundwater	NA				Total of Receptor Hazards Across GW	1

NA - Not Applicable.

Table E-10
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel C)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	1.1E-08	mg/kg-day	4.6E-02	kg-day/mg	5E-10	7.6E-07	mg/kg-day	5.0E-04	mg/kg-day	0.002
			Exp. Route Total								5E-10					0.002
			Dermal	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	1.1E-07	mg/kg-day	4.6E-02	kg-day/mg	5E-09	7.8E-06	mg/kg-day	5.0E-04	mg/kg-day	0.02
			Exp. Route Total								5E-09					0.02
		Exposure Point Total									6E-09					0.02
	Exposure Medium Total										6E-09					0.02
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	***VOCs***												
				Trichloroethylene	3.21E+01	ug/m3	5.23E-02	ug/m3	4.1E-06	$(ug/m3)^{-1}$	2E-07	3.7E+00	ug/m3	2.2E+00	ug/m3	2
			Exp. Route Total								2E-07					2
		Exposure Point Total									2E-07					2
	Exposure Medium Total										2E-07					2
Groundwater Total											2E-07					2
Total Receptor Risk										Total of Receptor Risks Across Groundwater	2E-07				Total of Receptor Hazards Across GW	2

NA - Not Applicable.

Table E-11
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel C)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	1.4E-05	mg/kg-day	4.6E-02	kg-day/mg	6E-07	3.8E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
			Exp. Route Total								6E-07					0.1
			Dermal	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	2.7E-07	mg/kg-day	4.6E-02	kg-day/mg	1E-08	7.4E-07	mg/kg-day	5.0E-04	mg/kg-day	0.001
			Exp. Route Total								1E-08					0.001
		Exposure Point Total									6E-07					0.1
	Exposure Medium Total										6E-07					0.1
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	7.63E-02	ug/m3	6.22E-03	ug/m3	4.1E-06	$(ug/m3)^{-1}$	3E-08	1.7E-02	ug/m3	2.0E+00	ug/m3	0.009
			Exp. Route Total								3E-08					0.009
		Exposure Point Total									3E-08					0.009
	Exposure Medium Total										3E-08					0.009
Groundwater Total											7E-07					0.09
Total Receptor Risk										Total of Receptor Risks Across Groundwater	7E-07				Total of Receptor Hazards Across GW	0.09

NA - Not Applicable.

Table E-12
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel C)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	4E-06	1.3E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
			Exp. Route Total								4E-06					0.3
			Dermal	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	6E-07	2.1E-05	mg/kg-day	5.0E-04	mg/kg-day	0.04
			Exp. Route Total								6E-07					0.04
		Exposure Point Total									5E-06					0.3
	Exposure Medium Total										5E-06					0.3
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation	***VOCs***												
				Trichloroethylene	2.22E+00	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	5E-06	6.3E-02	ug/m3	2.0E+00	ug/m3	0.03
			Exp. Route Total								5E-06					0.03
		Exposure Point Total									5E-06					0.03
		Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	2.98E-01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	6E-07	2.9E-01	ug/m3	2.0E+00	ug/m3	0.1
			Exp. Route Total								6E-07					0.1
		Exposure Point Total									6E-07					0.1
	Exposure Medium Total										5E-06					0.2
Groundwater Total											1E-05					0.5
Total Receptor Risk										Total of Receptor Risks Across Groundwater	1E-05				Total of Receptor Hazards Across GW	0.5

(1) Refer to Appendix D for the risk estimates for trichloroethylene.

Table E-13

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel C)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Intake/Exposure Concentration Value	Cancer Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Intake/Exposure Concentration Value	Noncancer Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	NA	NA	NA	NA	NA	2.2E-04	mg/kg-day	5.0E-04	mg/kg-day	0.4
			Exp. Route Total								NA					0.4
			Dermal	***VOCs***												
				Trichloroethylene	4.43E-03	mg/L	NA	NA	NA	NA	NA	3.2E-05	mg/kg-day	5.0E-04	mg/kg-day	0.06
			Exp. Route Total								NA					0.06
		Exposure Point Total									NA					0.5
	Exposure Medium Total										NA					0.5
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	2.98E-01	ug/m3	NA	NA	NA	NA	NA	2.9E-01	ug/m3	2.0E+00	ug/m3	0.1
			Exp. Route Total								NA					0.1
		Exposure Point Total									NA					0.1
	Exposure Medium Total										NA					0.1
Groundwater Total											NA					0.6
Total Receptor Risk										Total of Receptor Risks Across Groundwater	NA				Total of Receptor Hazards Across GW	0.6

NA - Not Applicable.

Table E-14

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel D)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	4.8E-08	mg/kg-day	4.6E-02	kg-day/mg	2E-09	3.4E-06	mg/kg-day	5.0E-04	mg/kg-day	0.007
			Exp. Route Total								2E-09					0.007
			Dermal	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	5.0E-07	mg/kg-day	4.6E-02	kg-day/mg	2E-08	3.5E-05	mg/kg-day	5.0E-04	mg/kg-day	0.07
			Exp. Route Total								2E-08					0.07
		Exposure Point Total									3E-08					0.08
	Exposure Medium Total										3E-08					0.08
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	***VOCs***												
				Trichloroethylene	1.43E+02	ug/m3	2.33E-01	ug/m3	4.1E-06	$(ug/m3)^{-1}$	1E-06	1.6E+01	ug/m3	2.2E+00	ug/m3	7
			Exp. Route Total								1E-06					7
		Exposure Point Total									1E-06					7
	Exposure Medium Total										1E-06					7
Groundwater Total											1E-06					8
Total Receptor Risk										Total of Receptor Risks Across Groundwater	1E-06				Total of Receptor Hazards Across GW	8

NA - Not Applicable.

Table E-15
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel D)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	6.0E-05	mg/kg-day	4.6E-02	kg-day/mg	3E-06	1.7E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
			Exp. Route Total								3E-06					0.3
			Dermal	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	1.2E-06	mg/kg-day	4.6E-02	kg-day/mg	5E-08	3.3E-06	mg/kg-day	5.0E-04	mg/kg-day	0.007
			Exp. Route Total								5E-08					0.007
		Exposure Point Total									3E-06					0.3
	Exposure Medium Total										3E-06					0.3
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	1.55E-01	ug/m3	1.27E-02	ug/m3	4.1E-06	$(ug/m3)^{-1}$	5E-08	3.5E-02	ug/m3	2.0E+00	ug/m3	0.02
			Exp. Route Total								5E-08					0.02
		Exposure Point Total									5E-08					0.02
	Exposure Medium Total										5E-08					0.02
Groundwater Total											3E-06					0.4
Total Receptor Risk										Total of Receptor Risks Across Groundwater	3E-06				Total of Receptor Hazards Across GW	0.4

NA - Not Applicable.

Table E-16
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel D)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

					EPC		Cancer Risk Calculations					Noncancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-05	5.9E-04	mg/kg-day	5.0E-04	mg/kg-day	1
			Exp. Route Total								2E-05					1
			Dermal	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	3E-06	9.3E-05	mg/kg-day	5.0E-04	mg/kg-day	0.2
			Exp. Route Total								3E-06					0.2
		Exposure Point Total									2E-05					1
	Exposure Medium Total										2E-05					1
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation	***VOCs***												
				Trichloroethylene	9.88E+00	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	2E-05	2.8E-01	ug/m3	2.0E+00	ug/m3	0.1
			Exp. Route Total								2E-05					0.1
		Exposure Point Total									2E-05					0.1
		Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.08E-01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	1E-06	5.8E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								1E-06					0.3
		Exposure Point Total									1E-06					0.3
	Exposure Medium Total										2E-05					0.4
Groundwater Total											4E-05					2
Total Receptor Risk										Total of Receptor Risks Across Groundwater	4E-05				Total of Receptor Hazards Across GW	2

(1) Refer to Appendix D for the risk estimates for trichloroethylene.

Table E-17

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel D)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	NA	NA	NA	NA	NA	9.9E-04	mg/kg-day	5.0E-04	mg/kg-day	2
			Exp. Route Total								NA					2
			Dermal	***VOCs***												
				Trichloroethylene	1.98E-02	mg/L	NA	NA	NA	NA	NA	1.4E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
			Exp. Route Total								NA					0.3
		Exposure Point Total									NA					2
	Exposure Medium Total										NA					2
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.08E-01	ug/m3	NA	NA	NA	NA	NA	5.8E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								NA					0.3
		Exposure Point Total									NA					0.3
	Exposure Medium Total										NA					0.3
Groundwater Total											NA					3
Total Receptor Risk										Total of Receptor Risks Across Groundwater	NA				Total of Receptor Hazards Across GW	3

NA - Not Applicable.

Table E-18
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel E)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Intake/Exposure Concentration Value	Cancer Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Intake/Exposure Concentration Value	Noncancer Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	*VOCs*												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	1.1E-08	mg/kg-day	NA	kg-day/mg	NA	7.5E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00004
				Trichloroethylene	1.45E-01	mg/L	3.5E-07	mg/kg-day	4.6E-02	kg-day/mg	2E-08	2.5E-05	mg/kg-day	5.0E-04	mg/kg-day	0.05
				Vinyl Chloride	3.40E-05	mg/L	8.3E-11	mg/kg-day	7.2E-01	kg-day/mg	6E-11	5.8E-09	mg/kg-day	3.0E-03	mg/kg-day	0.000002
			Exp. Route Total								2E-08					0.05
			Dermal	*VOCs*												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	9.6E-08	mg/kg-day	NA	kg-day/mg	NA	6.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
				Trichloroethylene	1.45E-01	mg/L	3.6E-06	mg/kg-day	4.6E-02	kg-day/mg	2E-07	2.5E-04	mg/kg-day	5.0E-04	mg/kg-day	0.5
				Vinyl Chloride	3.40E-05	mg/L	5.4E-10	mg/kg-day	7.2E-01	kg-day/mg	4E-10	3.8E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00001
			Exp. Route Total								2E-07					0.5
		Exposure Point Total									2E-07					0.6
	Exposure Medium Total										2E-07					0.6
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	*VOCs*												
				cis-1,2-Dichloroethene	3.66E+01	ug/m3	5.96E-02	ug/m3	NA	$(ug/m3)^{-1}$	NA	4.2E+00	ug/m3	NA	ug/m3	NA
				Trichloroethylene	1.05E+03	ug/m3	1.71E+00	ug/m3	4.1E-06	$(ug/m3)^{-1}$	7E-06	1.2E+02	ug/m3	2.2E+00	ug/m3	54
				Vinyl Chloride	3.58E-01	ug/m3	5.84E-04	ug/m3	4.4E-06	$(ug/m3)^{-1}$	3E-09	4.1E-02	ug/m3	8.0E+01	ug/m3	0.0005
			Exp. Route Total								7E-06					54
		Exposure Point Total									7E-06					54
	Exposure Medium Total										7E-06					54
Groundwater Total											7E-06					55
Total Receptor Risk										Total of Receptor Risks Across Groundwater	7E-06				Total of Receptor Hazards Across GW	55

NA - Not Applicable.

Table E-19
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel E)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	1.3E-05	mg/kg-day	NA	kg-day/mg	NA	3.7E-05	mg/kg-day	2.0E-03	mg/kg-day	0.02
				Trichloroethylene	1.45E-01	mg/L	4.4E-04	mg/kg-day	4.6E-02	kg-day/mg	2E-05	1.2E-03	mg/kg-day	5.0E-04	mg/kg-day	2
				Vinyl Chloride	3.40E-05	mg/L	1.0E-07	mg/kg-day	7.2E-01	kg-day/mg	7E-08	2.9E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
			Exp. Route Total								2E-05					2
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	2.0E-07	mg/kg-day	NA	kg-day/mg	NA	5.6E-07	mg/kg-day	2.0E-03	mg/kg-day	0.0003
				Trichloroethylene	1.45E-01	mg/L	8.7E-06	mg/kg-day	4.6E-02	kg-day/mg	4E-07	2.4E-05	mg/kg-day	5.0E-04	mg/kg-day	0.05
				Vinyl Chloride	3.40E-05	mg/L	9.8E-10	mg/kg-day	7.2E-01	kg-day/mg	7E-10	2.7E-09	mg/kg-day	3.0E-03	mg/kg-day	0.0000009
			Exp. Route Total								4E-07					0.05
		Exposure Point Total									2E-05					3
	Exposure Medium Total										2E-05					3
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Trichloroethylene	4.13E+00	ug/m3	3.37E-01	ug/m3	4.1E-06	$(ug/m3)^{-1}$	1E-06	9.4E-01	ug/m3	2.0E+00	ug/m3	0.5
			Exp. Route Total								1E-06					0.5
		Exposure Point Total									1E-06					0.5
	Exposure Medium Total										1E-06					0.5
Groundwater Total											2E-05					3
Total Receptor Risk										Total of Receptor Risks Across Groundwater	2E-05				Total of Receptor Hazards Across GW	3

NA - Not Applicable.

Table E-20
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel E)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	5.6E-05	mg/kg-day	NA	kg-day/mg	NA	1.3E-04	mg/kg-day	2.0E-03	mg/kg-day	0.07
				Trichloroethylene	1.45E-01	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	1E-04	4.3E-03	mg/kg-day	5.0E-04	mg/kg-day	9
				Vinyl Chloride	3.40E-05	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-06	1.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0003
			Exp. Route Total								1E-04					9
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	7.1E-06	mg/kg-day	NA	kg-day/mg	NA	1.7E-05	mg/kg-day	2.0E-03	mg/kg-day	0.008
				Trichloroethylene	1.45E-01	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-05	7.3E-04	mg/kg-day	5.0E-04	mg/kg-day	1
				Vinyl Chloride	3.40E-05	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	7E-07	8.2E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00003
			Exp. Route Total								2E-05					1
		Exposure Point Total									1E-04					10
	Exposure Medium Total										1E-04					10
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation													
				VOCs												
				cis-1,2-Dichloroethene	2.19E+00	ug/m3	2.30E-02	ug/m3	NA	$(ug/m3)^{-1}$	NA	6.2E-02	ug/m3	NA	ug/m3	NA
				Trichloroethylene	7.24E+01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	5E-09	2.1E+00	ug/m3	2.0E+00	ug/m3	1
				Vinyl Chloride	1.70E-02	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	1E-07	4.8E-04	ug/m3	1.0E+02	ug/m3	0.000005
			Exp. Route Total								1E-07					1
		Exposure Point Total									1E-07					1
		Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Trichloroethylene	1.61E+01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	3E-05	1.5E+01	ug/m3	2.0E+00	ug/m3	8
			Exp. Route Total								3E-05					8
		Exposure Point Total									3E-05					8
	Exposure Medium Total										3E-05					9
Groundwater Total											2E-04					19
Total Receptor Risk										Total of Receptor Risks Across Groundwater	2E-04				Total of Receptor Hazards Across SS, SSS, and GW	19

(1) Refer to Appendix D for the risk estimates for trichloroethylene and vinyl chloride.
NA - Not Applicable.

Table E-21
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel E)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	NA	NA	NA	NA	NA	2.2E-04	mg/kg-day	2.0E-03	mg/kg-day	0.1
				Trichloroethylene	1.45E-01	mg/L	NA	NA	NA	NA	NA	7.2E-03	mg/kg-day	5.0E-04	mg/kg-day	14
				Vinyl Chloride	3.40E-05	mg/L	NA	NA	NA	NA	NA	1.7E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0006
			Exp. Route Total								NA					15
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	4.37E-03	mg/L	NA	NA	NA	NA	NA	2.4E-05	mg/kg-day	2.0E-03	mg/kg-day	0.01
				Trichloroethylene	1.45E-01	mg/L	NA	NA	NA	NA	NA	1.1E-03	mg/kg-day	5.0E-04	mg/kg-day	2
				Vinyl Chloride	3.40E-05	mg/L	NA	NA	NA	NA	NA	1.2E-07	mg/kg-day	3.0E-03	mg/kg-day	0.00004
			Exp. Route Total								NA					2
		Exposure Point Total									NA					17
	Exposure Medium Total										NA					17
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	1.61E+01	ug/m3	NA	NA	NA	NA	NA	1.5E+01	ug/m3	2.0E+00	ug/m3	8
			Exp. Route Total								NA					8
		Exposure Point Total									NA					8
	Exposure Medium Total										NA					8
Groundwater Total											NA					24
Total Receptor Risk										Total of Receptor Risks Across Groundwater	NA				Total of Receptor Hazards Across SS, SSS, and GW	24

NA - Not Applicable.

Table E-22

Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Construction Worker (Parcel F)

Alabama Army National Guard OMS #28

Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Shallow Groundwater	Shallow Groundwater (Trench)	Ingestion	***VOCs***												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	2.2E-07	mg/kg-day	NA	kg-day/mg	NA	1.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0008
				Tetrachloroethene	1.90E-01	mg/L	4.7E-07	mg/kg-day	2.1E-03	kg-day/mg	1E-09	3.3E-05	mg/kg-day	8.0E-03	mg/kg-day	0.004
				trans-1,2-Dichloroethene	3.16E-02	mg/L	7.7E-08	mg/kg-day	NA	kg-day/mg	NA	5.4E-06	mg/kg-day	2.0E-01	mg/kg-day	0.00003
				Trichloroethylene	1.89E-01	mg/L	4.6E-07	mg/kg-day	4.6E-02	kg-day/mg	2E-08	3.2E-05	mg/kg-day	5.0E-04	mg/kg-day	0.06
				Vinyl Chloride	1.80E-04	mg/L	4.4E-10	mg/kg-day	7.2E-01	kg-day/mg	3E-10	3.1E-08	mg/kg-day	3.0E-03	mg/kg-day	0.00001
			Exp. Route Total								2E-08					0.07
			Dermal	***VOCs***												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	2.0E-06	mg/kg-day	NA	kg-day/mg	NA	1.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.007
				Tetrachloroethene	1.90E-01	mg/L	1.5E-05	mg/kg-day	2.1E-03	kg-day/mg	3E-08	1.1E-03	mg/kg-day	8.0E-03	mg/kg-day	0.1
				trans-1,2-Dichloroethene	3.16E-02	mg/L	6.9E-07	mg/kg-day	NA	kg-day/mg	NA	4.8E-05	mg/kg-day	2.0E-01	mg/kg-day	0.0002
				Trichloroethylene	1.89E-01	mg/L	4.8E-06	mg/kg-day	4.6E-02	kg-day/mg	2E-07	3.3E-04	mg/kg-day	5.0E-04	mg/kg-day	0.7
				Vinyl Chloride	1.80E-04	mg/L	2.9E-09	mg/kg-day	7.2E-01	kg-day/mg	2E-09	2.0E-07	mg/kg-day	3.0E-03	mg/kg-day	0.00007
			Exp. Route Total								3E-07					0.8
		Exposure Point Total									3E-07					0.9
	Exposure Medium Total										3E-07					0.9
	Vapors from Shallow Groundwater	Vapors from Volatilization (Trench)	Inhalation	***VOCs***												
				cis-1,2-Dichloroethene	7.52E+02	ug/m3	1.23E+00	ug/m3	NA	$(ug/m3)^{-1}$	NA	8.6E+01	ug/m3	NA	ug/m3	NA
				Tetrachloroethene	1.23E+03	ug/m3	2.00E+00	ug/m3	2.6E-07	$(ug/m3)^{-1}$	5E-07	1.4E+02	ug/m3	4.1E+01	ug/m3	3
				trans-1,2-Dichloroethene	2.66E+02	ug/m3	4.34E-01	ug/m3	NA	$(ug/m3)^{-1}$	NA	3.0E+01	ug/m3	7.9E+02	ug/m3	0.04
				Trichloroethylene	1.37E+03	ug/m3	2.24E+00	ug/m3	4.1E-06	$(ug/m3)^{-1}$	9E-06	1.6E+02	ug/m3	2.2E+00	ug/m3	71
				Vinyl Chloride	1.90E+00	ug/m3	3.09E-03	ug/m3	4.4E-06	$(ug/m3)^{-1}$	1E-08	2.2E-01	ug/m3	8.0E+01	ug/m3	0.003
			Exp. Route Total								1E-05					75
		Exposure Point Total									1E-05					75
	Exposure Medium Total										1E-05					75
Groundwater Total											1E-05					76
Total Receptor Risk										Total of Receptor Risks Across Groundwater	1E-05				Total of Receptor Hazards Across GW	76

NA - Not Applicable.

Table E-23
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Industrial Worker (Parcel F)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	2.7E-04	mg/kg-day	NA	kg-day/mg	NA	7.7E-04	mg/kg-day	2.0E-03	mg/kg-day	0.4
				Tetrachloroethene	1.90E-01	mg/L	5.8E-04	mg/kg-day	2.1E-03	kg-day/mg	1E-06	1.6E-03	mg/kg-day	6.0E-03	mg/kg-day	0.3
				trans-1,2-Dichloroethene	3.16E-02	mg/L	9.7E-05	mg/kg-day	NA	kg-day/mg	NA	2.7E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
				Trichloroethylene	1.89E-01	mg/L	5.8E-04	mg/kg-day	4.6E-02	kg-day/mg	3E-05	1.6E-03	mg/kg-day	5.0E-04	mg/kg-day	3
				Vinyl Chloride	1.80E-04	mg/L	5.5E-07	mg/kg-day	7.2E-01	kg-day/mg	4E-07	1.5E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0005
			Exp. Route Total								3E-05					4
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	4.1E-06	mg/kg-day	NA	kg-day/mg	NA	1.1E-05	mg/kg-day	2.0E-03	mg/kg-day	0.006
				Tetrachloroethene	1.90E-01	mg/L	4.1E-05	mg/kg-day	2.1E-03	kg-day/mg	9E-08	1.1E-04	mg/kg-day	6.0E-03	mg/kg-day	0.02
				trans-1,2-Dichloroethene	3.16E-02	mg/L	1.4E-06	mg/kg-day	NA	kg-day/mg	NA	4.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
				Trichloroethylene	1.89E-01	mg/L	1.1E-05	mg/kg-day	4.6E-02	kg-day/mg	5E-07	3.2E-05	mg/kg-day	5.0E-04	mg/kg-day	0.06
				Vinyl Chloride	1.80E-04	mg/L	5.2E-09	mg/kg-day	7.2E-01	kg-day/mg	4E-09	1.4E-08	mg/kg-day	3.0E-03	mg/kg-day	0.000005
			Exp. Route Total								6E-07					0.09
		Exposure Point Total									3E-05					4
	Exposure Medium Total										3E-05					4
	Groundwater	Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Tetrachloroethene	5.93E+00	ug/m3	4.83E-01	ug/m3	2.6E-07	$(ug/m3)^{-1}$	1E-07	1.4E+00	ug/m3	4.0E+01	ug/m3	0.03
				trans-1,2-Dichloroethene	7.20E-01	ug/m3	5.87E-02	ug/m3	NA	$(ug/m3)^{-1}$	NA	1.6E-01	ug/m3	4.0E+01	ug/m3	0.004
				Trichloroethylene	4.53E+00	ug/m3	3.70E-01	ug/m3	4.1E-06	$(ug/m3)^{-1}$	2E-06	1.0E+00	ug/m3	2.0E+00	ug/m3	0.5
				Vinyl Chloride	1.53E-02	ug/m3	1.25E-03	ug/m3	4.4E-06	$(ug/m3)^{-1}$	5E-09	3.5E-03	ug/m3	8.0E+01	ug/m3	0.00004
			Exp. Route Total								2E-06					0.6
		Exposure Point Total									2E-06					0.6
	Exposure Medium Total										2E-06					0.6
Groundwater Total											3E-05					5
Total Receptor Risk										Total of Receptor Risks Across Groundwater	3E-05				Total of Receptor Hazards Across GW	5

NA - Not Applicable.

Table E-24
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Adult (Parcel F)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

							Cancer Risk Calculations					Noncancer Hazard Calculations				
	Exposure	Exposure	Exposure	Chemical of	EPC		Intake/Exposure Concentration		CSF/Unit Risk		Cancer	Intake/Exposure Concentration		RfD/RfC		Hazard
Medium	Medium	Point	Route	Concern	Value	Units	Value	Units	Value	Units	Risk	Value	Units	Value	Units	Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	1.2E-03	mg/kg-day	NA	kg-day/mg	NA	2.7E-03	mg/kg-day	2.0E-03	mg/kg-day	1
				Tetrachloroethene	1.90E-01	mg/L	2.4E-03	mg/kg-day	2.1E-03	kg-day/mg	5E-06	5.7E-03	mg/kg-day	6.0E-03	mg/kg-day	0.9
				trans-1,2-Dichloroethene	3.16E-02	mg/L	4.1E-04	mg/kg-day	NA	kg-day/mg	NA	9.5E-04	mg/kg-day	2.0E-02	mg/kg-day	0.05
				Trichloroethylene	1.89E-01	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	2E-04	5.7E-03	mg/kg-day	5.0E-04	mg/kg-day	11
				Vinyl Chloride	1.80E-04	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	9E-06	5.4E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
			Exp. Route Total								2E-04					14
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	1.4E-04	mg/kg-day	NA	kg-day/mg	NA	3.2E-04	mg/kg-day	2.0E-03	mg/kg-day	0.2
				Tetrachloroethene	1.90E-01	mg/L	1.4E-03	mg/kg-day	2.1E-03	kg-day/mg	3E-06	3.2E-03	mg/kg-day	6.0E-03	mg/kg-day	1
				trans-1,2-Dichloroethene	3.16E-02	mg/L	4.9E-05	mg/kg-day	NA	kg-day/mg	NA	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
				Trichloroethylene	1.89E-01	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	3E-05	8.9E-04	mg/kg-day	5.0E-04	mg/kg-day	2
				Vinyl Chloride	1.80E-04	mg/L	(1)	mg/kg-day	(1)	kg-day/mg	7E-07	4.1E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
			Exp. Route Total								3E-05					2
		Exposure Point Total									2E-04					16
	Exposure Medium Total										2E-04					16
	Vapors from Groundwater	Water Vapors at Showerhead	Inhalation													
				VOCs												
				cis-1,2-Dichloroethene	4.50E+01	ug/m3	4.74E-01	ug/m3	NA	$(ug/m3)^{-1}$	NA	1.3E+00	ug/m3	NA	ug/m3	NA
				Tetrachloroethene	9.51E+01	ug/m3	1.00E+00	ug/m3	2.6E-07	$(ug/m3)^{-1}$	3E-07	2.7E+00	ug/m3	4.0E+01	ug/m3	0.07
				trans-1,2-Dichloroethene	1.58E+01	ug/m3	1.66E-01	ug/m3	NA	$(ug/m3)^{-1}$	NA	4.5E-01	ug/m3	4.0E+01	ug/m3	0.01
				Trichloroethylene	9.47E+01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	2E-04	2.7E+00	ug/m3	2.0E+00	ug/m3	1
				Vinyl Chloride	9.00E-02	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	5E-07	2.6E-03	ug/m3	8.0E+01	ug/m3	0.00003
			Exp. Route Total								2E-04					1
		Exposure Point Total									2E-04					1
		Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Tetrachloroethene	2.34E+01	ug/m3	8.35E+00	ug/m3	2.6E-07	$(ug/m3)^{-1}$	2E-06	2.2E+01	ug/m3	4.0E+01	ug/m3	0.6
				trans-1,2-Dichloroethene	2.76E+00	ug/m3	9.85E-01	ug/m3	NA	$(ug/m3)^{-1}$	NA	2.7E+00	ug/m3	4.0E+01	ug/m3	0.07
				Trichloroethylene	1.77E+01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	4E-05	1.7E+01	ug/m3	2.0E+00	ug/m3	8
				Vinyl Chloride	5.81E-02	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	3E-07	5.6E-02	ug/m3	8.0E+01	ug/m3	0.0007
			Exp. Route Total								4E-05					9
		Exposure Point Total									4E-05					9
	Exposure Medium Total										2E-04					11
Groundwater Total											4E-04					27
Total Receptor Risk										Total of Receptor Risks Across Groundwater	4E-04				Total of Receptor Hazards Across SS, SSS, and GW	27

(1) Refer to Appendix D for the risk estimates for trichloroethylene and vinyl chloride.

NA - Not Applicable.

Table E-25
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Future Resident Child (Parcel F)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater	Groundwater	Ingestion													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	NA	NA	NA	NA	NA	4.5E-03	mg/kg-day	2.0E-03	mg/kg-day	2
				Tetrachloroethene	1.90E-01	mg/L	NA	NA	NA	NA	NA	9.5E-03	mg/kg-day	6.0E-03	mg/kg-day	2
				trans-1,2-Dichloroethene	3.16E-02	mg/L	NA	NA	NA	NA	NA	1.6E-03	mg/kg-day	2.0E-02	mg/kg-day	0.08
				Trichloroethylene	1.89E-01	mg/L	NA	NA	NA	NA	NA	9.4E-03	mg/kg-day	5.0E-04	mg/kg-day	19
				Vinyl Chloride	1.80E-04	mg/L	NA	NA	NA	NA	NA	9.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.003
			Exp. Route Total								NA					23
			Dermal													
				VOCs												
				cis-1,2-Dichloroethene	8.99E-02	mg/L	NA	NA	NA	NA	NA	5.0E-04	mg/kg-day	2.0E-03	mg/kg-day	0.2
				Tetrachloroethene	1.90E-01	mg/L	NA	NA	NA	NA	NA	5.0E-03	mg/kg-day	6.0E-03	mg/kg-day	1
				trans-1,2-Dichloroethene	3.16E-02	mg/L	NA	NA	NA	NA	NA	1.8E-04	mg/kg-day	2.0E-02	mg/kg-day	0.009
				Trichloroethylene	1.89E-01	mg/L	NA	NA	NA	NA	NA	1.4E-03	mg/kg-day	5.0E-04	mg/kg-day	3
				Vinyl Chloride	1.80E-04	mg/L	NA	NA	NA	NA	NA	6.1E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0002
			Exp. Route Total								NA					4
		Exposure Point Total									NA					27
	Exposure Medium Total										NA					27
	Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation													
				VOCs												
				Tetrachloroethene	2.34E+01	ug/m3	NA	NA	NA	NA	NA	2.2E+01	ug/m3	4.0E+01	ug/m3	0.6
				trans-1,2-Dichloroethene	2.76E+00	ug/m3	NA	NA	NA	NA	NA	2.7E+00	ug/m3	4.0E+01	ug/m3	0.07
				Trichloroethylene	1.77E+01	ug/m3	NA	NA	NA	NA	NA	1.7E+01	ug/m3	2.0E+00	ug/m3	8
				Vinyl Chloride	5.81E-02	ug/m3	NA	NA	NA	NA	NA	5.6E-02	ug/m3	8.0E+01	ug/m3	0.0007
			Exp. Route Total								NA					9
		Exposure Point Total									NA					9
	Exposure Medium Total										NA					9
Groundwater Total											NA					36
Total Receptor Risk								Total of Receptor Risks Across Groundwater			NA	Total of Receptor Hazards Across SS, SSS, and GW				36

NA - Not Applicable.

Table E-26
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Current / Future Resident Adult (Parcel H)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Current / Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.08E-01	ug/m3	(1)	ug/m3	(1)	$(ug/m3)^{-1}$	1E-06	5.8E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								1E-06					0.3
		Exposure Point Total									1E-06					0.3
	Exposure Medium Total										1E-06					0.3
Groundwater Total											1E-06					0.3
Total Receptor Risk										Total of Receptor Risks Across Groundwater	1E-06				Total of Receptor Hazards Across SS, SSS, and GW	0.3

(1) Refer to Appendix D for the risk estimates for trichloroethylene.

Table E-27
Calculation Of Chemical Cancer Risks And Non-Cancer Hazards - Current / Future Resident Child (Parcel H)
Alabama Army National Guard OMS #28
Mobile, Alabama

Scenario Timeframe: Current / Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Concern	EPC Value	EPC Units	Cancer Risk Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	CSF/Unit Risk Value	CSF/Unit Risk Units	Cancer Risk	Noncancer Hazard Calculations: Intake/Exposure Concentration Value	Intake/Exposure Concentration Units	RfD/RfC Value	RfD/RfC Units	Hazard Quotient
Groundwater	Groundwater Vapors from Groundwater	Indoor Air Via Vapor Intrusion	Inhalation	***VOCs***												
				Trichloroethylene	6.08E-01	ug/m3	NA	NA	NA	NA	NA	5.8E-01	ug/m3	2.0E+00	ug/m3	0.3
			Exp. Route Total								NA					0.3
		Exposure Point Total									NA					0.3
	Exposure Medium Total										NA					0.3
Groundwater Total											NA					0.3
Total Receptor Risk										Total of Receptor Risks Across Groundwater	NA				Total of Receptor Hazards Across Groundwater	0.3

NA - Not Applicable.

APPENDIX F

JOHNSON AND ETTINGER MODELING OUTPUT

(Provided on CD)

Table F.1-1
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	3.8E-05	2.8E-05 - 3.8E-05	0.0000	2.7E-05 - 3.8E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	3.050E+02	2.2E+02 - 3.1E+02	3.0E+02	2.2E+02 - 3.1E+02
Please check WARNING or ERROR flags	(ppbv)	4.5E+01	3.3E+01 - 4.6E+01	4.5E+01	3.3E+01 - 4.6E+01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	13751		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	8121660					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	4.921%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.1-1
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-1
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.1-1
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.8E-05**	2.8E-05 - 3.8E-05	**3.7E-05**	2.7E-05 - 3.8E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**3.1E+02**	2.2E+02 - 3.1E+02	**3.0E+02**	2.2E+02 - 3.1E+02		
	(ppbv)		**4.5E+01**	3.3E+01 - 4.6E+01	**4.5E+01**	3.3E+01 - 4.5E+01	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**1.0E+05**	6.2E+03 - 2.2E+06	**1.0E+05**	2.2E+06 - 3.1E+06		
	(ppbv)		**1.5E+04**	9.1E+02 - 3.3E+05	**1.5E+04**	3.3E+05 - 4.5E+05		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.0E-03	-	1.0E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.8E-05	-	3.8E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.0E+03	3.5E+01 - 1.7E+04	1.0E+03	3.5E+01 - 1.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

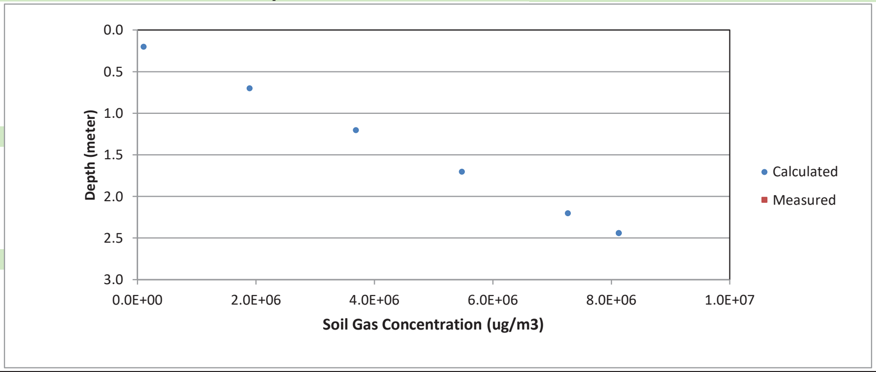
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-1
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.72E+01**	-	**4.72E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**6.96E+00**	-	**6.96E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.127E+03**	**2.1E+03 - 2.9E+03**	**1.72E+03**	**2.1E+03 - 2.9E+03**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**6.47E-06**	**4.7E-06 - 6.5E-06**	**6.45E-06**	**4.7E-06 - 6.5E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**1.74E+00**	**1.3E+00 - 1.8E+00**	**1.74E+00**	**1.3E+00 - 1.8E+00**		

Table F.1-2
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.1E-05	3.4E-05 - 5.2E-05	0.0001	3.4E-05 - 5.2E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	3.418E-01	2.3E-01 - 3.5E-01	3.4E-01	2.3E-01 - 3.5E-01
Please check WARNING or ERROR flags	(ppbv)	6.4E-02	4.3E-02 - 6.5E-02	6.3E-02	4.3E-02 - 6.5E-02

Model Input — **Site Name/Run Number:** Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	19.84		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	6676					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-2
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-2
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-2
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	**5.1E-05**	3.4E-05 - 5.2E-05	**5.1E-05**	3.4E-05 - 5.2E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	**3.4E-01**	2.3E-01 - 3.5E-01	**3.4E-01**	2.3E-01 - 3.5E-01		
	(ppbv)		**6.4E-02**	4.3E-02 - 6.5E-02	**6.3E-02**	4.2E-02 - 6.4E-02	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	**1.1E+02**	6.9E+00 - 2.3E+03	**1.1E+02**	2.3E+03 - 3.5E+03		
	(ppbv)		**2.1E+01**	1.3E+00 - 4.3E+02	**2.1E+01**	4.2E+02 - 6.4E+02		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.4E-03	-	1.4E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.2E-05	-	5.2E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

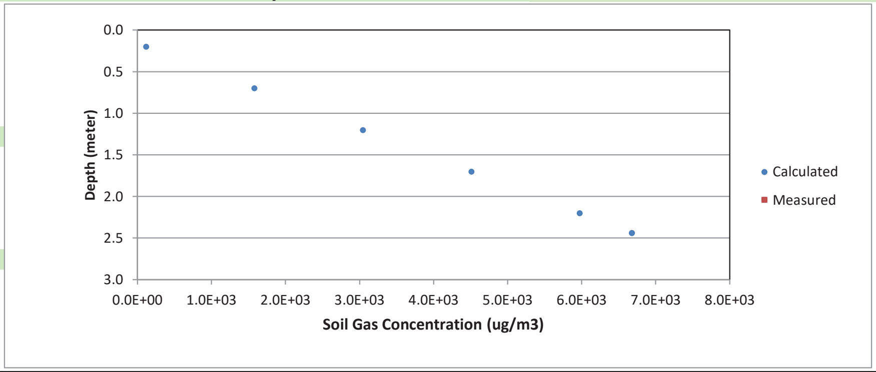
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-2
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels **Scenario: Commercial**								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.30E+02**	**2.3E+02 - 3.4E+02**	**9.85E+01**	**1.2E+02 - 1.8E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**3.29E-07**	**2.2E-07 - 3.3E-07**	**3.28E-07**	**2.2E-07 - 3.3E-07**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**3.90E-02**	**2.6E-02 - 4.0E-02**	**3.89E-02**	**2.6E-02 - 3.9E-02**		

Table F.1-3
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.1E-05	3.4E-05 - 5.2E-05	0.0001	3.4E-05 - 5.2E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.723E-01	1.2E-01 - 1.8E-01	1.7E-01	1.1E-01 - 1.7E-01
Please check WARNING or ERROR flags	(ppbv)	3.2E-02	2.1E-02 - 3.3E-02	3.2E-02	2.1E-02 - 3.3E-02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	10		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	3365					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-3
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-3
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-3
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Model Output | **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.1E-05**	3.4E-05 - 5.2E-05	**5.1E-05**	3.4E-05 - 5.2E-05	WARNING	Please review warning messages
Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**1.7E-01**	1.2E-01 - 1.8E-01	**1.7E-01**	1.1E-01 - 1.7E-01		
	(ppbv)		**3.2E-02**	2.1E-02 - 3.3E-02	**3.2E-02**	2.1E-02 - 3.2E-02	WARNING	Please review warning messages
Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Subslab vapor concentration	(ug/m3)	**Css**	**5.7E+01**	3.5E+00 - 1.2E+03	**5.7E+01**	1.1E+03 - 1.7E+03		
	(ppbv)		**1.1E+01**	6.5E-01 - 2.1E+02	**1.1E+01**	2.1E+02 - 3.2E+02		
Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.4E-03	-	1.4E-03	-		

Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.2E-05	-	5.2E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

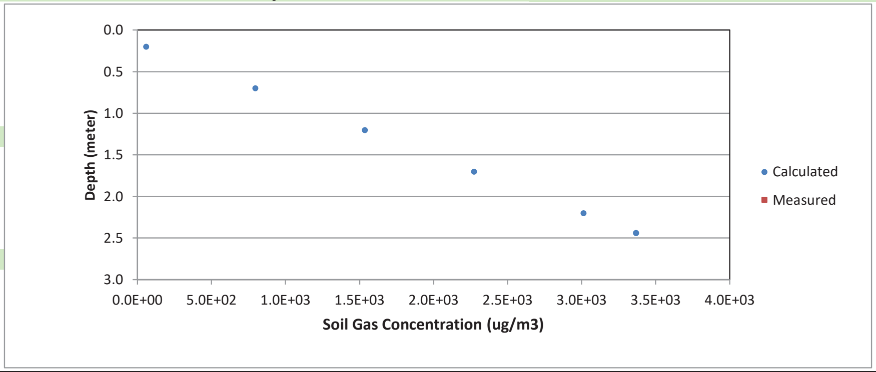
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-3
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.30E+02**	**2.3E+02 - 3.4E+02**	**9.85E+01**	**1.2E+02 - 1.8E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.66E-07**	**1.1E-07 - 1.7E-07**	**1.65E-07**	**1.1E-07 - 1.7E-07**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**1.97E-02**	**1.3E-02 - 2.0E-02**	**1.96E-02**	**1.3E-02 - 2.0E-02**		

Table F.1-4
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.1E-05	3.4E-05 - 5.2E-05	0.0001	3.4E-05 - 5.2E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	7.631E-02	5.1E-02 - 7.8E-02	7.6E-02	5.1E-02 - 7.7E-02
Please check WARNING or ERROR flags	(ppbv)	1.4E-02	9.5E-03 - 1.4E-02	1.4E-02	9.5E-03 - 1.4E-02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	4.43		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	1491					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-4
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-4
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-4
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	**5.1E-05**	3.4E-05 - 5.2E-05	**5.1E-05**	3.4E-05 - 5.2E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	**7.6E-02**	5.1E-02 - 7.8E-02	**7.6E-02**	5.1E-02 - 7.7E-02		
	(ppbv)		**1.4E-02**	9.5E-03 - 1.4E-02	**1.4E-02**	9.5E-03 - 1.4E-02	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	**2.5E+01**	1.6E+00 - 5.1E+02	**2.5E+01**	5.1E+02 - 7.7E+02		
	(ppbv)		**4.7E+00**	2.9E-01 - 9.5E+01	**4.7E+00**	9.5E+01 - 1.4E+02		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.4E-03	-	1.4E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.2E-05	-	5.2E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

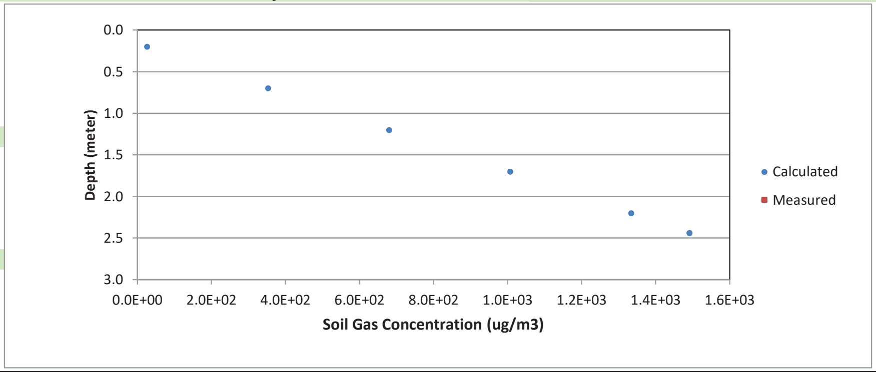
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-4
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.30E+02**	**2.3E+02 - 3.4E+02**	**9.85E+01**	**1.2E+02 - 1.8E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**7.35E-08**	**4.9E-08 - 7.5E-08**	**7.32E-08**	**4.9E-08 - 7.4E-08**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**8.71E-03**	**5.8E-03 - 8.9E-03**	**8.68E-03**	**5.8E-03 - 8.8E-03**		

Table F.1-5
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.1E-05	3.4E-05 - 5.2E-05	0.0001	3.4E-05 - 5.2E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.554E-01	1.0E-01 - 1.6E-01	1.5E-01	1.0E-01 - 1.6E-01
Please check WARNING or ERROR flags	(ppbv)	2.9E-02	1.9E-02 - 2.9E-02	2.9E-02	1.9E-02 - 2.9E-02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	9.02		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	3035					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^oC	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^oC	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-5
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-5
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-5
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.1E-05**	3.4E-05 - 5.2E-05	**5.1E-05**	3.4E-05 - 5.2E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**1.6E-01**	1.0E-01 - 1.6E-01	**1.5E-01**	1.0E-01 - 1.6E-01		
	(ppbv)		**2.9E-02**	1.9E-02 - 2.9E-02	**2.9E-02**	1.9E-02 - 2.9E-02	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**5.2E+01**	3.2E+00 - 1.0E+03	**5.2E+01**	1.0E+03 - 1.6E+03		
	(ppbv)		**9.6E+00**	5.9E-01 - 1.9E+02	**9.6E+00**	1.9E+02 - 2.9E+02		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.4E-03	-	1.4E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.2E-05	-	5.2E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

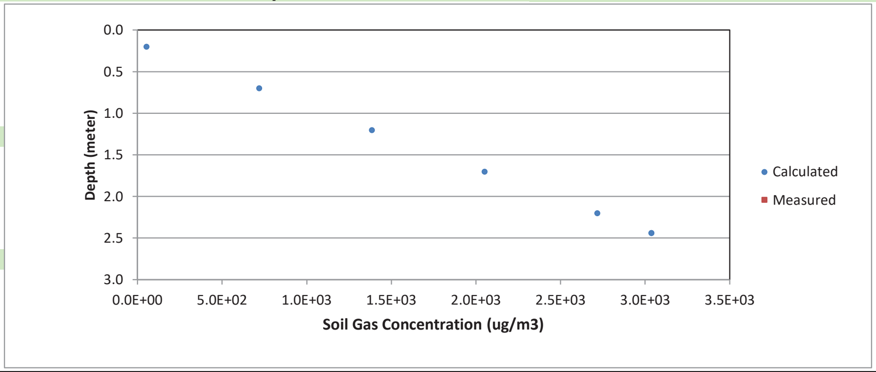
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-5
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels **Scenario: Commercial**								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.30E+02**	**2.3E+02 - 3.4E+02**	**9.85E+01**	**1.2E+02 - 1.8E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.50E-07**	**1.0E-07 - 1.5E-07**	**1.49E-07**	**1.0E-07 - 1.5E-07**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**1.77E-02**	**1.2E-02 - 1.8E-02**	**1.77E-02**	**1.2E-02 - 1.8E-02**		

Table F.1-6
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.3E-05	3.5E-05 - 5.4E-05	0.0001	3.5E-05 - 5.4E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	4.135E+00	2.7E+00 - 4.2E+00	4.1E+00	2.7E+00 - 4.2E+00
Please check WARNING or ERROR flags	(ppbv)	7.7E-01	5.1E-01 - 7.8E-01	7.7E-01	5.1E-01 - 7.8E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	230.4		NA			
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	77527					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.016%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-6
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-6
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene **CAS No. 79-01-6**
Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-6
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.3E-05**	3.5E-05 - 5.4E-05	**5.3E-05**	3.5E-05 - 5.4E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**4.1E+00**	2.7E+00 - 4.2E+00	**4.1E+00**	2.7E+00 - 4.2E+00		
	(ppbv)		**7.7E-01**	5.1E-01 - 7.8E-01	**7.7E-01**	5.1E-01 - 7.8E-01	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**1.4E+03**	8.4E+01 - 2.7E+04	**1.4E+03**	2.7E+04 - 4.2E+04		
	(ppbv)		**2.6E+02**	1.6E+01 - 5.1E+03	**2.6E+02**	5.1E+03 - 7.8E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.4E-05	-	5.4E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

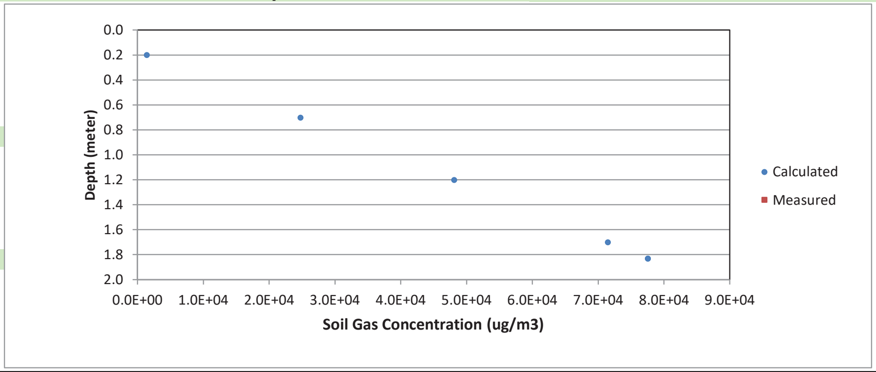
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-6
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.20E+02**	**2.2E+02 - 3.3E+02**	**9.46E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**3.98E-06**	**2.6E-06 - 4.0E-06**	**3.96E-06**	**2.6E-06 - 4.0E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**4.72E-01**	**3.1E-01 - 4.8E-01**	**4.70E-01**	**3.1E-01 - 4.8E-01**		

Table F.1-7
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	4.0E-05	2.9E-05 - 4.0E-05	0.0000	2.9E-05 - 4.0E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	5.928E+00	4.3E+00 - 6.0E+00	5.9E+00	4.3E+00 - 6.0E+00
Please check WARNING or ERROR flags	(ppbv)	8.7E-01	6.3E-01 - 8.9E-01	8.7E-01	6.3E-01 - 8.9E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	251.1		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	148305					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.090%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.1-7
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-7
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene   CAS No. 127-18-4

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.1-7
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**4.0E-05**	2.9E-05 - 4.0E-05	**4.0E-05**	2.9E-05 - 4.0E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**5.9E+00**	4.3E+00 - 6.0E+00	**5.9E+00**	4.3E+00 - 6.0E+00		
	(ppbv)		**8.7E-01**	6.3E-01 - 8.9E-01	**8.7E-01**	6.3E-01 - 8.8E-01	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**2.0E+03**	1.2E+02 - 4.3E+04	**2.0E+03**	4.3E+04 - 6.0E+04		
	(ppbv)		**2.9E+02**	1.8E+01 - 6.3E+03	**2.9E+02**	6.3E+03 - 8.8E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	6.5E-04	-	6.5E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	4.1E-05	-	4.0E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.0E+03	3.5E+01 - 1.7E+04	1.0E+03	3.5E+01 - 1.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

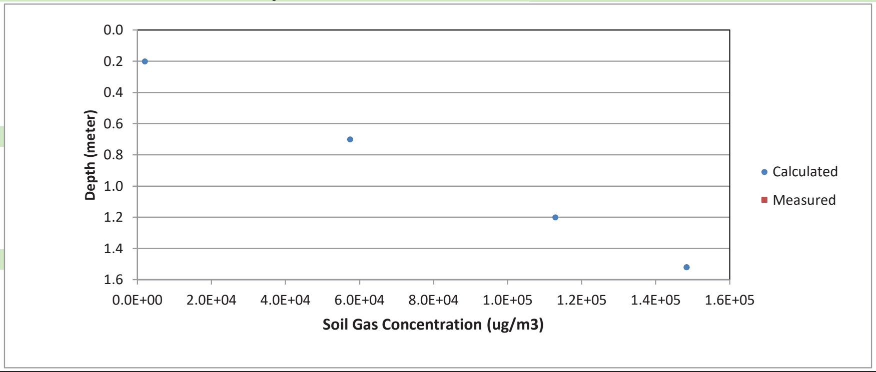
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-7
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.72E+01**	-	**4.72E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**6.96E+00**	-	**6.96E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.998E+03**	**2.0E+03 - 2.8E+03**	**1.61E+03**	**2.0E+03 - 2.8E+03**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.26E-07**	**9.1E-08 - 1.3E-07**	**1.25E-07**	**9.0E-08 - 1.3E-07**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**3.38E-02**	**2.4E-02 - 3.4E-02**	**3.37E-02**	**2.4E-02 - 3.4E-02**		

Table F.1-8
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	6.9E-05	4.1E-05 - 7.1E-05	0.0001	4.1E-05 - 7.0E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	7.20E-01	4.3E-01 - 7.4E-01	7.2E-01	4.3E-01 - 7.3E-01
Please check WARNING or ERROR flags	(ppbv)	1.8E-01	1.1E-01 - 1.9E-01	1.8E-01	1.1E-01 - 1.9E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	31.6		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	10432					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Dichloroethylene, 1,2-trans-					
CAS No.		CAS	156-60-5					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	Not Available	Not Available	NA	NA		No IUR available for this compound.
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	Not Available	Not Available	NA	NA		No RfC available for this compound.

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	4.52E+03	4.52E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.38E-03	9.38E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	3.84E-01	3.84E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.30E-01	3.89E-01				
Diffusivity in air	(cm2/s)	Dair	8.76E-02	8.76E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.12E-05	1.12E-05	NA	NA		

Table F.1-8
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions
- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-8
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.1-8
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**6.9E-05**	4.1E-05 - 7.1E-05	**6.9E-05**	4.1E-05 - 7.0E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**7.2E-01**	4.3E-01 - 7.4E-01	**7.2E-01**	4.3E-01 - 7.3E-01		
	(ppbv)		**1.8E-01**	1.1E-01 - 1.9E-01	**1.8E-01**	1.1E-01 - 1.8E-01	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**2.4E+02**	1.5E+01 - 4.3E+03	**2.4E+02**	4.3E+03 - 7.3E+03		
	(ppbv)		**6.1E+01**	3.7E+00 - 1.1E+03	**6.0E+01**	1.1E+03 - 1.8E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.2E-02	-	1.2E-02	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.8E-04	-	1.8E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	7.1E-05	-	7.0E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	6.0E+02	2.0E+01 - 1.0E+04	6.0E+02	2.0E+01 - 1.0E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

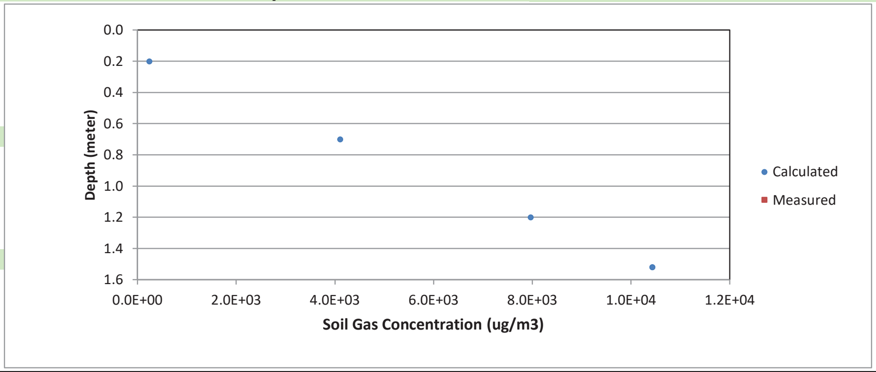
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-8
Johnson and Ettinger Model Input and Output
Future Industrial Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Dichloroethylene, 1,2-trans-
0

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**lo tox data availabl**	-	**No tox data available**	-		
	(ppbv)		**No tox data availabl**	-	**NA**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**lo tox data availabl**	**NA - NA**	**No tox data available**	**NA - NA**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**No IUR Available**	**NA - NA**	**No IUR Available**	**NA - NA**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**No RfC Available**	**NA - NA**	**No RfC Available**	**NA - NA**		

Table F.1-9
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.4E-05	3.6E-05 - 5.5E-05	0.0001	3.6E-05 - 5.5E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	4.534E+00	3.0E+00 - 4.6E+00	4.5E+00	3.0E+00 - 4.6E+00
Please check WARNING or ERROR flags	(ppbv)	8.4E-01	5.5E-01 - 8.6E-01	8.4E-01	5.5E-01 - 8.6E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	247.3		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	83214					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.017%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-9
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-9
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-9
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.4E-05**	3.6E-05 - 5.5E-05	**5.4E-05**	3.6E-05 - 5.5E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**4.5E+00**	3.0E+00 - 4.6E+00	**4.5E+00**	3.0E+00 - 4.6E+00		
	(ppbv)		**8.4E-01**	5.5E-01 - 8.6E-01	**8.4E-01**	5.5E-01 - 8.6E-01	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**1.5E+03**	9.2E+01 - 3.0E+04	**1.5E+03**	3.0E+04 - 4.6E+04		
	(ppbv)		**2.8E+02**	1.7E+01 - 5.5E+03	**2.8E+02**	5.5E+03 - 8.6E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.0E-04	-	8.9E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.5E-05	-	5.5E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

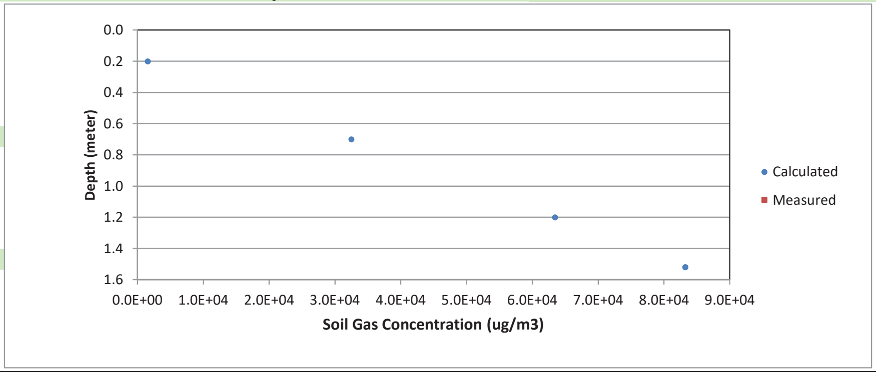
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-9
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.16E+02**	**2.1E+02 - 3.3E+02**	**9.26E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**4.37E-06**	**2.9E-06 - 4.4E-06**	**4.35E-06**	**2.9E-06 - 4.4E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**5.18E-01**	**3.4E-01 - 5.3E-01**	**5.15E-01**	**3.4E-01 - 5.2E-01**		

Table F.1-10
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	8.3E-05	4.6E-05 - 8.5E-05	0.0001	4.6E-05 - 8.5E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.532E-02	8.5E-03 - 1.6E-02	1.5E-02	8.5E-03 - 1.6E-02
Please check WARNING or ERROR flags	(ppbv)	6.0E-03	3.3E-03 - 6.2E-03	6.0E-03	3.3E-03 - 6.2E-03

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	0.18		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	185					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	1.00E-01	1.00E-01	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.03E+00	1.15E+00				
Diffusivity in air	(cm2/s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.20E-05	1.20E-05	NA	NA		

Table F.1-10
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.1-10
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-10
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	8.3E-05	4.6E-05 - 8.5E-05	8.3E-05	4.6E-05 - 8.5E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	1.5E-02	8.5E-03 - 1.6E-02	1.5E-02	8.5E-03 - 1.6E-02		
	(ppbv)		6.0E-03	3.3E-03 - 6.2E-03	6.0E-03	3.3E-03 - 6.2E-03	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	5.1E+00	3.1E-01 - 8.5E+01	5.1E+00	8.5E+01 - 1.6E+02		
	(ppbv)		2.0E+00	1.2E-01 - 3.3E+01	2.0E+00	3.3E+01 - 6.2E+01		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.5E-02	-	1.5E-02	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	2.1E-04	-	2.1E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.4E-03	-	1.4E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	8.5E-05	-	8.5E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	4.9E+02	1.6E+01 - 8.2E+03	4.9E+02	1.6E+01 - 8.2E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

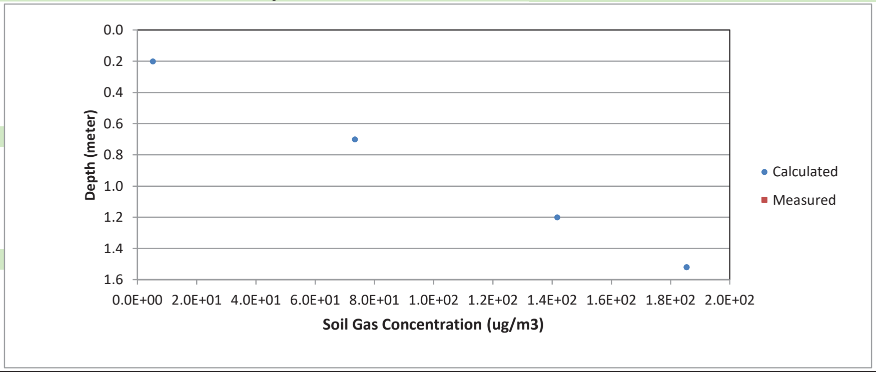
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.1-10
Johnson and Ettinger Model Input and Output
Future Indutrial Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Vinyl Chloride
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Vinyl Chloride CAS No. 75-01-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	Scenario: Commercial							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.10E-01**	-	**2.10E-01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**8.22E-02**	-	**8.22E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.47E+00**	**2.4E+00 - 4.4E+00**	**2.21E+00**	**2.4E+00 - 4.4E+00**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**7.29E-08**	**4.1E-08 - 7.5E-08**	**7.29E-08**	**4.1E-08 - 7.5E-08**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**3.50E-05**	**1.9E-05 - 3.6E-05**	**3.50E-05**	**1.9E-05 - 3.6E-05**		

Table F.1-11
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.5E-04	6.2E-05 - 1.6E-04	0.0001	6.2E-05 - 1.6E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.209E+03	5.0E+02 - 1.3E+03	1.2E+03	5.0E+02 - 1.3E+03
	(ppbv)	1.8E+02	7.4E+01 - 1.9E+02	1.8E+02	7.4E+01 - 1.9E+02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	13751		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	8121660					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	4.921%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.1-11
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-11
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.1-11
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.5E-04**	6.2E-05 - 1.6E-04	**1.5E-04**	6.2E-05 - 1.6E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**1.2E+03**	5.0E+02 - 1.3E+03	**1.2E+03**	5.0E+02 - 1.3E+03		
	(ppbv)		**1.8E+02**	7.4E+01 - 1.9E+02	**1.8E+02**	7.4E+01 - 1.9E+02		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**4.0E+05**	2.5E+04 - 5.0E+06	**4.0E+05**	5.0E+06 - 1.3E+07		
	(ppbv)		**5.9E+04**	3.7E+03 - 7.4E+05	**5.9E+04**	7.4E+05 - 1.9E+06		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.6E-04	-	1.6E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

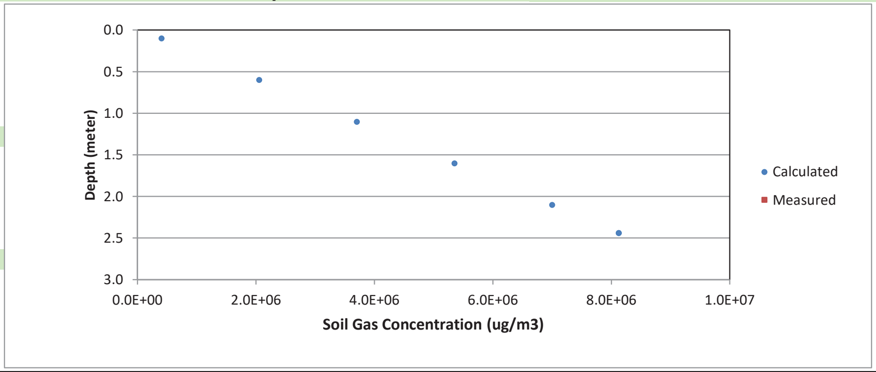


Table F.1-11
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output | **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.08E+01**	-	**1.08E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**1.59E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.23E+02**	**1.2E+02 - 3.0E+02**	**9.92E+01**	**1.2E+02 - 3.0E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.12E-04**	**4.6E-05 - 1.2E-04**	**1.12E-04**	**4.6E-05 - 1.2E-04**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**2.90E+01**	**1.2E+01 - 3.0E+01**	**2.89E+01**	**1.2E+01 - 3.0E+01**		

Table F.1-12
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.337E+00	4.7E-01 - 1.4E+00	1.3E+00	4.7E-01 - 1.4E+00
	(ppbv)	2.5E-01	8.7E-02 - 2.7E-01	2.5E-01	8.7E-02 - 2.7E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	19.84		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	6676					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-12
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-12
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	**1.3E+00**	4.7E-01 - 1.4E+00	**1.3E+00**	4.7E-01 - 1.4E+00		
	(ppbv)		**2.5E-01**	8.7E-02 - 2.7E-01	**2.5E-01**	8.7E-02 - 2.6E-01		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	**4.5E+02**	2.9E+01 - 4.7E+03	**4.4E+02**	4.7E+03 - 1.4E+04		
	(ppbv)		**8.3E+01**	5.3E+00 - 8.7E+02	**8.3E+01**	8.7E+02 - 2.6E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

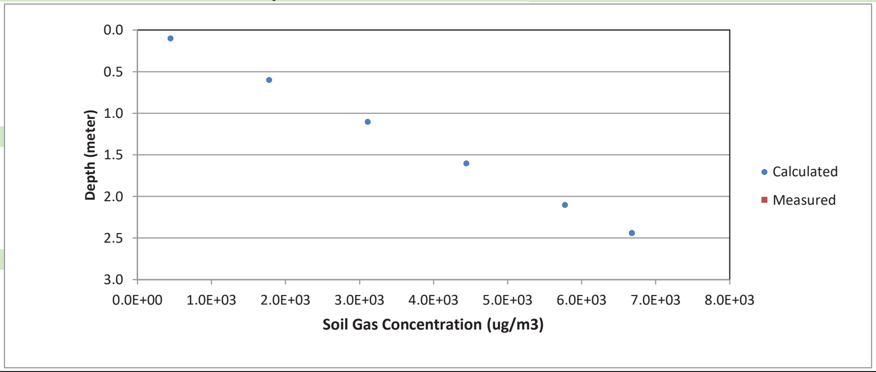


Table F.1-12
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output | **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Residential**							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**5.41E-06**	**1.9E-06 - 5.8E-06**	**5.38E-06**	**1.9E-06 - 5.7E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**6.41E-01**	**2.3E-01 - 6.8E-01**	**6.38E-01**	**2.2E-01 - 6.8E-01**		

Table F.1-13
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	6.737E-01	2.4E-01 - 7.2E-01	6.7E-01	2.4E-01 - 7.2E-01
	(ppbv)	1.3E-01	4.4E-02 - 1.3E-01	1.2E-01	4.4E-02 - 1.3E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	10		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	3365					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-13
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-13
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-13
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Model Output Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.0E-04	7.0E-05 - 2.1E-04	2.0E-04	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	6.7E-01	2.4E-01 - 7.2E-01	6.7E-01	2.4E-01 - 7.2E-01		
	(ppbv)		1.3E-01	4.4E-02 - 1.3E-01	1.2E-01	4.4E-02 - 1.3E-01		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	2.2E+02	1.4E+01 - 2.4E+03	2.2E+02	2.4E+03 - 7.2E+03		
	(ppbv)		4.2E+01	2.7E+00 - 4.4E+02	4.2E+01	4.4E+02 - 1.3E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

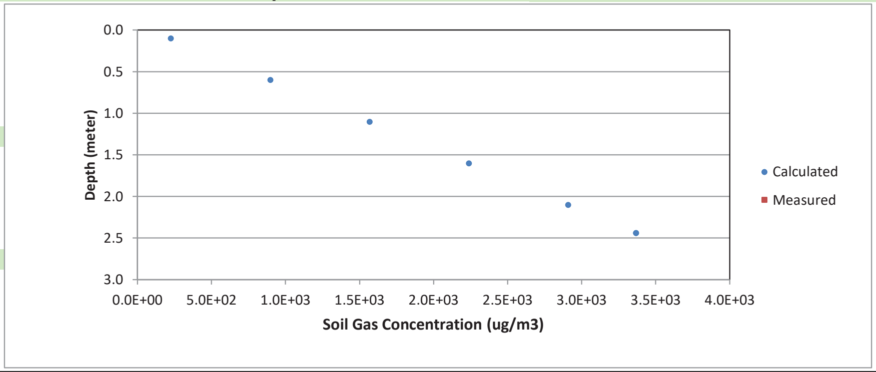


Table F.1-13
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel B)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**2.72E-06**	**9.6E-07 - 2.9E-06**	**2.71E-06**	**9.6E-07 - 2.9E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**3.23E-01**	**1.1E-01 - 3.4E-01**	**3.22E-01**	**1.1E-01 - 3.4E-01**		

Table F.1-14
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	2.985E-01	1.0E-01 - 3.2E-01	3.0E-01	1.0E-01 - 3.2E-01
	(ppbv)	5.6E-02	2.0E-02 - 5.9E-02	5.5E-02	2.0E-02 - 5.9E-02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	4.43		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	1491					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-14
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-14
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-14
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**3.0E-01**	1.0E-01 - 3.2E-01	**3.0E-01**	1.0E-01 - 3.2E-01		
	(ppbv)		**5.6E-02**	2.0E-02 - 5.9E-02	**5.5E-02**	2.0E-02 - 5.9E-02		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**9.9E+01**	6.4E+00 - 1.0E+03	**9.9E+01**	1.0E+03 - 3.2E+03		
	(ppbv)		**1.9E+01**	1.2E+00 - 2.0E+02	**1.8E+01**	2.0E+02 - 5.9E+02		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

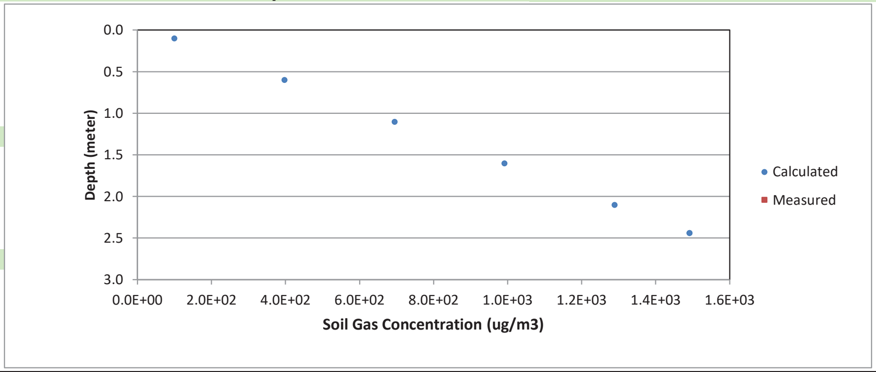


Table F.1-14
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel C)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**1.21E-06**	**4.2E-07 - 1.3E-06**	**1.20E-06**	**4.2E-07 - 1.3E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**1.43E-01**	**5.0E-02 - 1.5E-01**	**1.43E-01**	**5.0E-02 - 1.5E-01**		

Table F.1-15
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	6.077E-01	2.1E-01 - 6.5E-01	6.1E-01	2.1E-01 - 6.5E-01
	(ppbv)	1.1E-01	4.0E-02 - 1.2E-01	1.1E-01	4.0E-02 - 1.2E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	9.02		NA			
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	3035					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-15
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-15
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-15
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**6.1E-01**	2.1E-01 - 6.5E-01	**6.1E-01**	2.1E-01 - 6.5E-01		
	(ppbv)		**1.1E-01**	4.0E-02 - 1.2E-01	**1.1E-01**	4.0E-02 - 1.2E-01		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**2.0E+02**	1.3E+01 - 2.1E+03	**2.0E+02**	2.1E+03 - 6.5E+03		
	(ppbv)		**3.8E+01**	2.4E+00 - 4.0E+02	**3.8E+01**	4.0E+02 - 1.2E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

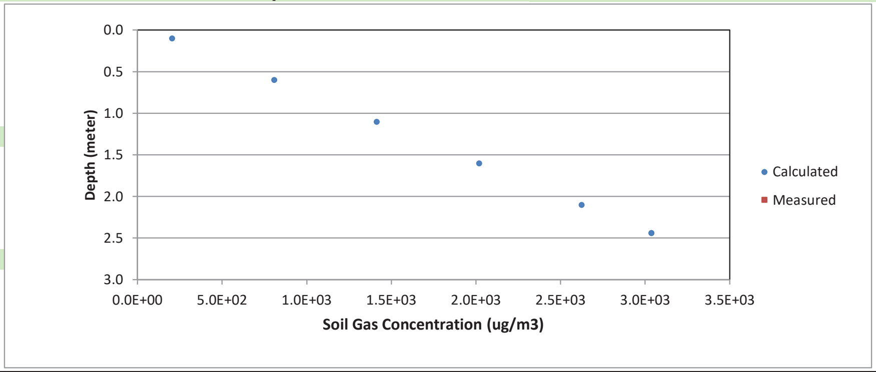


Table F.1-15
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**2.46E-06**	**8.6E-07 - 2.6E-06**	**2.45E-06**	**8.6E-07 - 2.6E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**2.91E-01**	**1.0E-01 - 3.1E-01**	**2.90E-01**	**1.0E-01 - 3.1E-01**		

Table F.1-16
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.1E-05 - 2.2E-04	0.0002	7.1E-05 - 2.2E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.613E+01	5.5E+00 - 1.7E+01	1.6E+01	5.5E+00 - 1.7E+01
	(ppbv)	3.0E+00	1.0E+00 - 3.2E+00	3.0E+00	1.0E+00 - 3.2E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	230.4		NA			
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	77527					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.016%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-16
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-16
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6
Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-16
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.1E-05 - 2.2E-04	**2.1E-04**	7.1E-05 - 2.2E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**1.6E+01**	5.5E+00 - 1.7E+01	**1.6E+01**	5.5E+00 - 1.7E+01		
	(ppbv)		**3.0E+00**	1.0E+00 - 3.2E+00	**3.0E+00**	1.0E+00 - 3.2E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**5.4E+03**	3.5E+02 - 5.5E+04	**5.4E+03**	5.5E+04 - 1.7E+05		
	(ppbv)		**1.0E+03**	6.4E+01 - 1.0E+04	**1.0E+03**	1.0E+04 - 3.2E+04		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-04	-	2.2E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

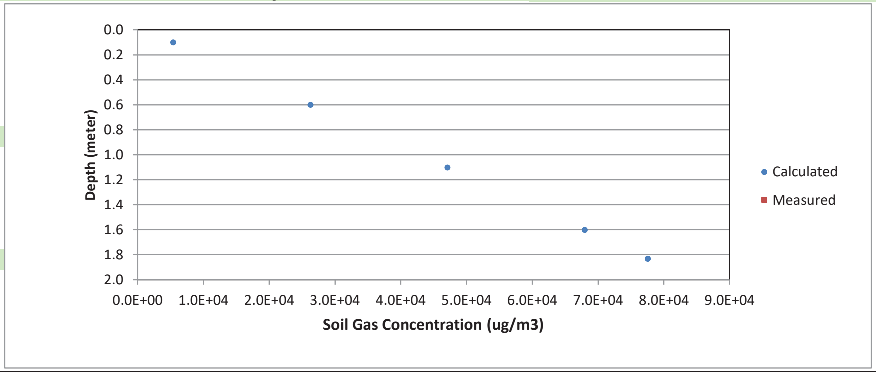


Table F.1-16
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.83E+00**	**6.4E+00 - 2.0E+01**	**5.65E+00**	**6.4E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**6.52E-05**	**2.2E-05 - 7.0E-05**	**6.50E-05**	**2.2E-05 - 6.9E-05**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**7.73E+00**	**2.7E+00 - 8.3E+00**	**7.70E+00**	**2.6E+00 - 8.2E+00**		

Table F.1-17
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.6E-04	6.3E-05 - 1.7E-04	0.0002	6.3E-05 - 1.7E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	2.343E+01	9.4E+00 - 2.5E+01	2.3E+01	9.3E+00 - 2.5E+01
	(ppbv)	3.5E+00	1.4E+00 - 3.6E+00	3.4E+00	1.4E+00 - 3.6E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	251.1		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	148305					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.090%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.1-17
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-17
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.6E-04**	6.3E-05 - 1.7E-04	**1.6E-04**	6.3E-05 - 1.7E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**2.3E+01**	9.4E+00 - 2.5E+01	**2.3E+01**	9.3E+00 - 2.5E+01		
	(ppbv)		**3.5E+00**	1.4E+00 - 3.6E+00	**3.4E+00**	1.4E+00 - 3.6E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**7.8E+03**	4.9E+02 - 9.4E+04	**7.8E+03**	9.3E+04 - 2.5E+05		
	(ppbv)		**1.2E+03**	7.3E+01 - 1.4E+04	**1.1E+03**	1.4E+04 - 3.6E+04		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	7.0E-04	-	7.0E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.7E-04	-	1.7E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

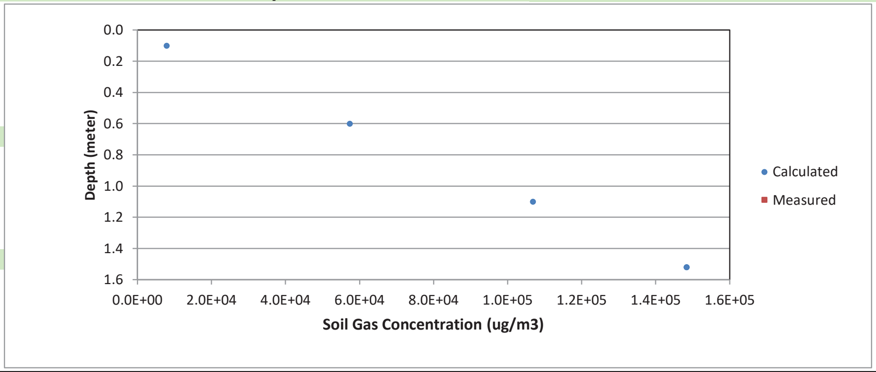


Table F.1-17
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.08E+01**	-	**1.08E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**1.59E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.16E+02**	**1.1E+02 - 2.9E+02**	**9.35E+01**	**1.1E+02 - 2.9E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**2.17E-06**	**8.7E-07 - 2.3E-06**	**2.16E-06**	**8.7E-07 - 2.3E-06**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**5.62E-01**	**2.2E-01 - 5.9E-01**	**5.60E-01**	**2.2E-01 - 5.9E-01**		

Table F.1-18
Johnson and Ettinger Model Input and Output
Future Residential Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.7E-04	8.0E-05 - 2.9E-04	0.0003	8.0E-05 - 2.9E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	2.76E+00	8.3E-01 - 3.0E+00	2.8E+00	8.3E-01 - 3.0E+00
	(ppbv)	7.0E-01	2.1E-01 - 7.6E-01	7.0E-01	2.1E-01 - 7.6E-01

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	31.6		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	10432					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.001%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Dichloroethylene, 1,2-trans-					
CAS No.		CAS	156-60-5					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	Not Available	Not Available	NA	NA		No IUR available for this compound.
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	Not Available	Not Available	NA	NA		No RfC available for this compound.

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	4.52E+03	4.52E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.38E-03	9.38E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	3.84E-01	3.84E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.30E-01	3.89E-01				
Diffusivity in air	(cm2/s)	Dair	8.76E-02	8.76E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.12E-05	1.12E-05	NA	NA		

Table F.1-18
Johnson and Ettinger Model Input and Output
Future Residential Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-18
Johnson and Ettinger Model Input and Output
Future Residential Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.1-18
Johnson and Ettinger Model Input and Output
Future Residential Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.7E-04**	8.0E-05 - 2.9E-04	**2.6E-04**	8.0E-05 - 2.9E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**2.8E+00**	8.3E-01 - 3.0E+00	**2.8E+00**	8.3E-01 - 3.0E+00		
	(ppbv)		**7.0E-01**	2.1E-01 - 7.6E-01	**7.0E-01**	2.1E-01 - 7.6E-01		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**9.2E+02**	6.0E+01 - 8.3E+03	**9.2E+02**	8.3E+03 - 3.0E+04		
	(ppbv)		**2.3E+02**	1.5E+01 - 2.1E+03	**2.3E+02**	2.1E+03 - 7.6E+03		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.2E-02	-	1.2E-02	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.8E-04	-	1.8E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.2E-03	-	1.2E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.9E-04	-	2.9E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.3E+01	2.4E+00 - 1.2E+03	7.3E+01	2.4E+00 - 1.2E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

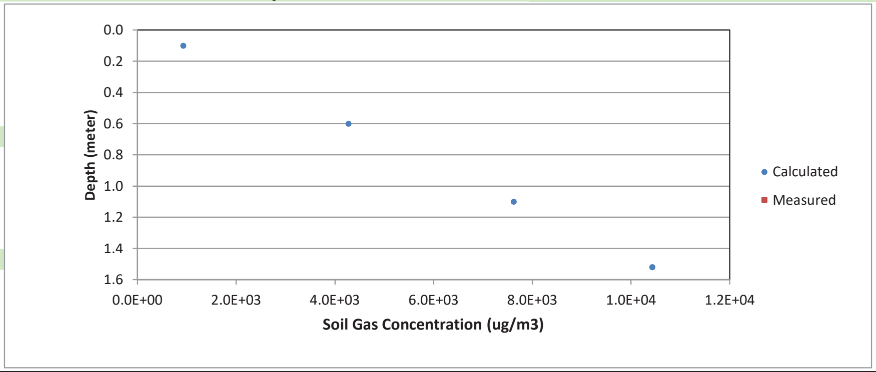


Table F.1-18
Johnson and Ettinger Model Input and Output
Future Residential Scenario - trans-1,2-Dichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Dichloroethylene, 1,2-trans-
0.000001

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Dichloroethylene, 1,2-trans- CAS No. 156-60-5

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**lo tox data availabl**	-	**No tox data available**	-		
	(ppbv)		**No tox data availabl**	-	**NA**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**lo tox data availabl**	**NA - NA**	**No tox data available**	**NA - NA**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**No IUR Available**	**NA - NA**	**No IUR Available**	**NA - NA**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**No RfC Available**	**NA - NA**	**No RfC Available**	**NA - NA**		

Table F.1-19
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.2E-05 - 2.3E-04	0.0002	7.2E-05 - 2.3E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	1.767E+01	6.0E+00 - 1.9E+01	1.8E+01	6.0E+00 - 1.9E+01
	(ppbv)	3.3E+00	1.1E+00 - 3.5E+00	3.3E+00	1.1E+00 - 3.5E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	247.3		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	83214					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.017%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.1-19
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-19
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.1-19
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.2E-05 - 2.3E-04	**2.1E-04**	7.2E-05 - 2.3E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**1.8E+01**	6.0E+00 - 1.9E+01	**1.8E+01**	6.0E+00 - 1.9E+01		
	(ppbv)		**3.3E+00**	1.1E+00 - 3.5E+00	**3.3E+00**	1.1E+00 - 3.5E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**5.9E+03**	3.8E+02 - 6.0E+04	**5.9E+03**	6.0E+04 - 1.9E+05		
	(ppbv)		**1.1E+03**	7.0E+01 - 1.1E+04	**1.1E+03**	1.1E+04 - 3.5E+04		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.6E-04	-	9.5E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.3E-04	-	2.3E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

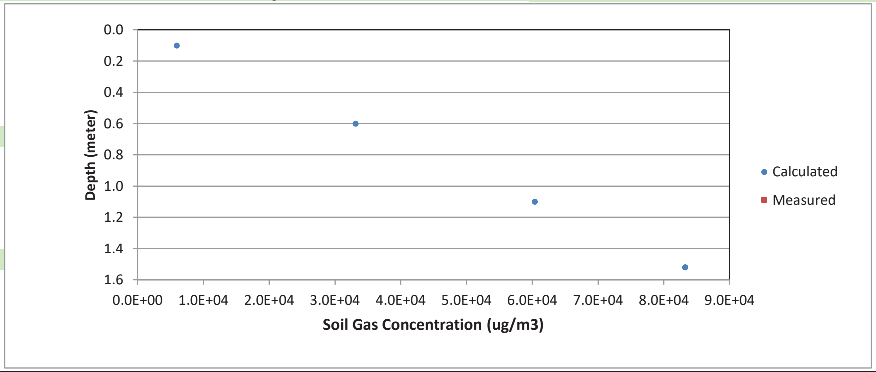


Table F.1-19
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output — **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels — **Scenario: Residential**								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.70E+00**	**6.2E+00 - 2.0E+01**	**5.54E+00**	**6.3E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**7.15E-05**	**2.4E-05 - 7.7E-05**	**7.12E-05**	**2.4E-05 - 7.6E-05**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**8.47E+00**	**2.9E+00 - 9.1E+00**	**8.44E+00**	**2.9E+00 - 9.0E+00**		

Table F.1-20
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	3.1E-04	8.7E-05 - 3.5E-04	0.0003	8.7E-05 - 3.5E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	5.81E-02	1.6E-02 - 6.4E-02	5.8E-02	1.6E-02 - 6.4E-02
	(ppbv)	2.3E-02	6.3E-03 - 2.5E-02	2.3E-02	6.3E-03 - 2.5E-02

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium	0.18		NA			
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	185					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Vinyl Chloride					
CAS No.		CAS	75-01-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.40E-06	4.40E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	1.00E-01	1.00E-01	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	8.80E+03	8.80E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	2.78E-02	2.78E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	1.14E+00	1.14E+00				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	1.03E+00	1.15E+00				
Diffusivity in air	(cm2/s)	Dair	1.07E-01	1.07E-01	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.20E-05	1.20E-05	NA	NA		

Table F.1-20
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.1-20
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		
Exposure Parameters:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.1E-04**	8.7E-05 - 3.5E-04	**3.1E-04**	8.7E-05 - 3.5E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**5.8E-02**	1.6E-02 - 6.4E-02	**5.8E-02**	1.6E-02 - 6.4E-02		
	(ppbv)		**2.3E-02**	6.3E-03 - 2.5E-02	**2.3E-02**	6.3E-03 - 2.5E-02		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**1.9E+01**	1.3E+00 - 1.6E+02	**1.9E+01**	1.6E+02 - 6.4E+02		
	(ppbv)		**7.6E+00**	5.0E-01 - 6.3E+01	**7.6E+00**	6.3E+01 - 2.5E+02		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	1.5E-02	-	1.5E-02	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	2.1E-04	-	2.1E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.5E-04	-	3.5E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	6.0E+01	2.0E+00 - 9.9E+02	6.0E+01	2.0E+00 - 9.9E+02	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil and advection through foundation both control intrusion.

Critical Parameters

Hb, Ls, DeffT, ach, Qsoil_Qb

Non-Critical Parameters

Lf, DeffA, eta

Concentration versus Depth Profile

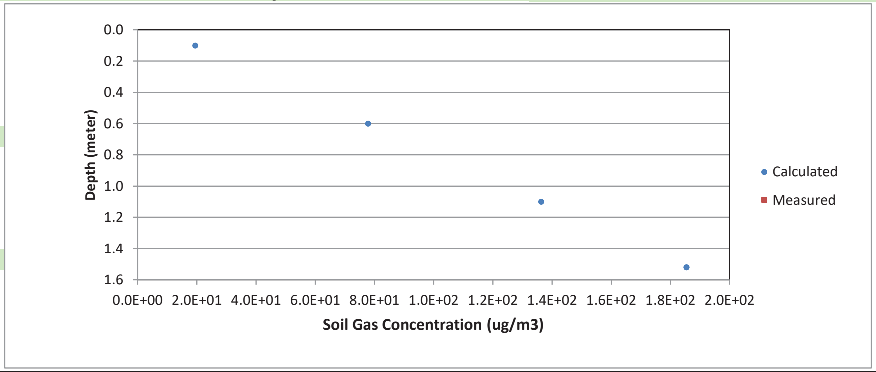


Table F.1-20
Johnson and Ettinger Model Input and Output
Future Residential Scenario - Vinyl Chloride (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Vinyl Chloride
0.000001

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Vinyl Chloride CAS No. 75-01-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.68E-01**	-	**1.68E-01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**6.56E-02**	-	**6.56E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**5.19E-01**	**4.7E-01 - 1.9E+00**	**4.64E-01**	**4.7E-01 - 1.9E+00**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**3.47E-07**	**9.6E-08 - 3.8E-07**	**3.46E-07**	**9.6E-08 - 3.8E-07**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**5.57E-04**	**1.5E-04 - 6.2E-04**	**5.57E-04**	**1.5E-04 - 6.2E-04**		

Table F.2-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	3.8E-05	2.8E-05 - 3.8E-05	0.0000	2.7E-05 - 3.8E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.2-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.2-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.2-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.8E-05**	2.8E-05 - 3.8E-05	**3.7E-05**	2.7E-05 - 3.8E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.0E-03	-	1.0E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.8E-05	-	3.8E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.0E+03	3.5E+01 - 1.7E+04	1.0E+03	3.5E+01 - 1.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

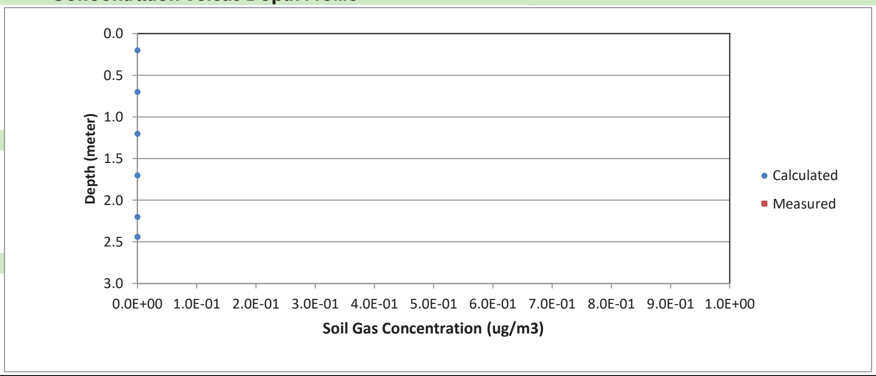
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.2-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.72E+01**	-	**4.72E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**6.96E+00**	-	**6.96E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.127E+03**	**2.1E+03 - 2.9E+03**	**1.72E+03**	**2.1E+03 - 2.9E+03**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.3E-05	3.5E-05 - 5.4E-05	0.0001	3.5E-05 - 5.4E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.2-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	5.3E-05	3.5E-05 - 5.4E-05	5.3E-05	3.5E-05 - 5.4E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		
	(ppbv)		0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		
	(ppbv)		0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.4E-05	-	5.4E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

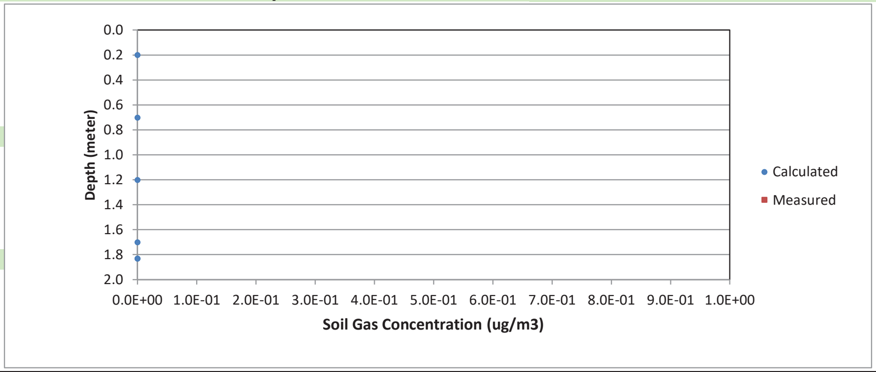
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.2-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Commercial**							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.20E+02**	**2.2E+02 - 3.3E+02**	**9.46E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.4E-05	3.6E-05 - 5.5E-05	0.0001	3.6E-05 - 5.5E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.2-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No.** 79-01-6

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.4E-05**	3.6E-05 - 5.5E-05	**5.4E-05**	3.6E-05 - 5.5E-05	WARNING	Please review warning messages
Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages
Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.0E-04	-	8.9E-04	-		
Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.5E-05	-	5.5E-05			
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04		
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02		

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

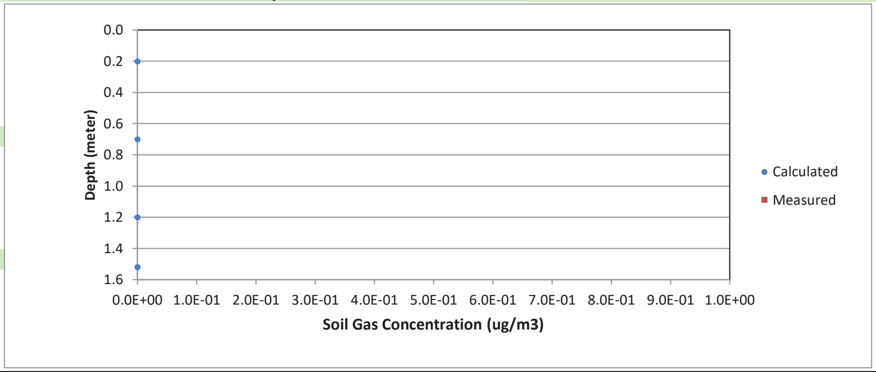
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.2-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+00**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E-01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.16E+02**	**2.1E+02 - 3.3E+02**	**9.26E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.5E-04	6.2E-05 - 1.6E-04	0.0001	6.2E-05 - 1.6E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.2-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input Site Name/Run Number: Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4
Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.2-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.5E-04**	6.2E-05 - 1.6E-04	**1.5E-04**	6.2E-05 - 1.6E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.6E-04	-	1.6E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

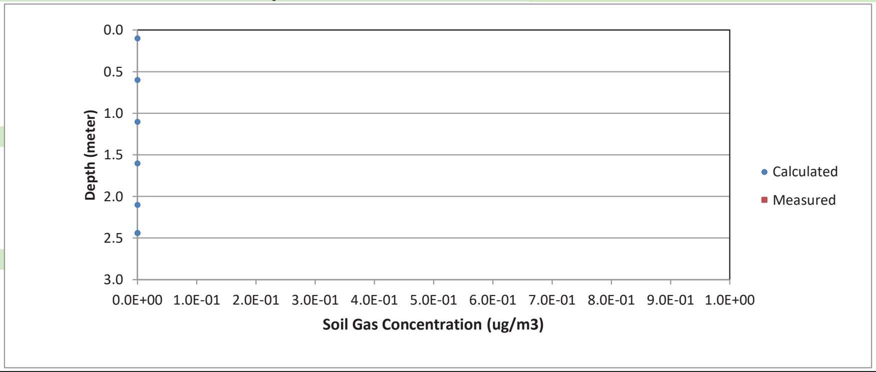


Table F.2-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.08E+01**	-	**1.08E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**1.59E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.23E+02**	**1.2E+02 - 3.0E+02**	**9.92E+01**	**1.2E+02 - 3.0E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	**Unit**	**Value**	**Range**	**Default**	**Default Range**
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	**Units**	**Symbol**	**Value**	**Default**	**Potential Span**	**CV**	**Flag**	**Comment**
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6
Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

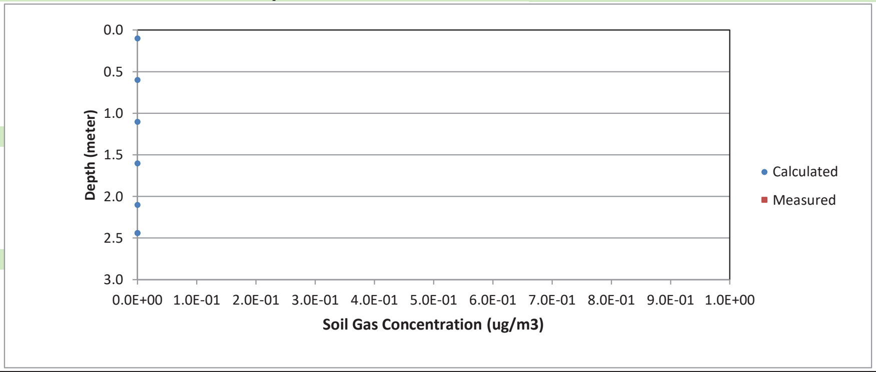


Table F.2-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Residential**							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6
Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

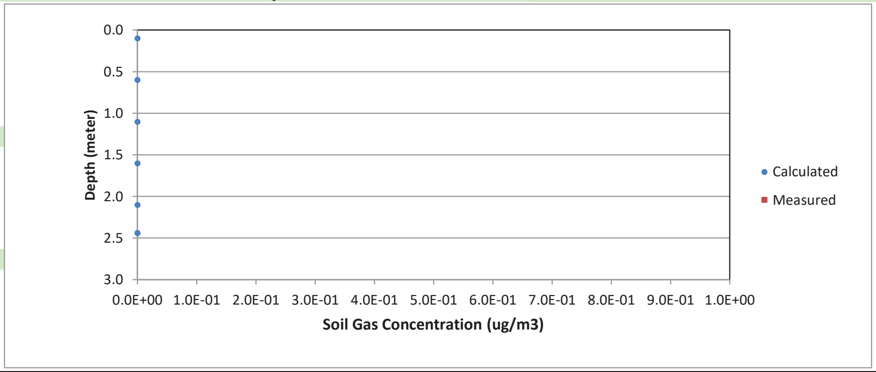


Table F.2-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Residential**							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+00**	**6.7E+00 - 2.0E+01**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.1E-05 - 2.2E-04	0.0002	7.1E-05 - 2.2E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.1E-05 - 2.2E-04	**2.1E-04**	7.1E-05 - 2.2E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-04	-	2.2E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

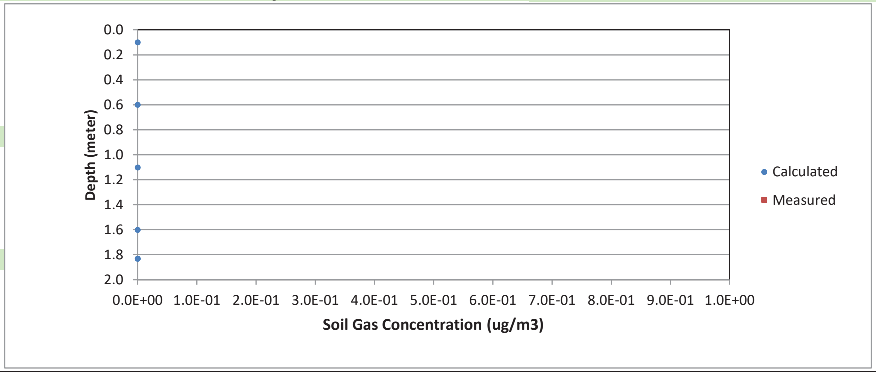


Table F.2-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.83E+00**	**6.4E+00 - 2.0E+01**	**5.65E+00**	**6.4E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.6E-04	6.3E-05 - 1.7E-04	0.0002	6.3E-05 - 1.7E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.2-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4
Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.2-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene   CAS No. 127-18-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.6E-04**	6.3E-05 - 1.7E-04	**1.6E-04**	6.3E-05 - 1.7E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	7.0E-04	-	7.0E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.7E-04	-	1.7E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

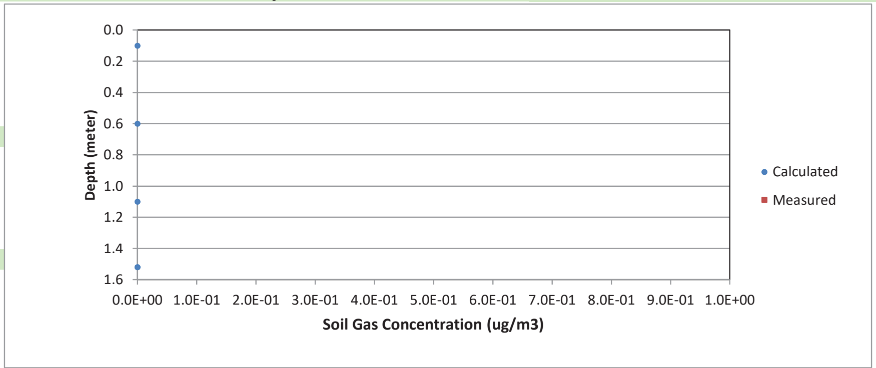


Table F.2-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	Scenario: Residential							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.08E+01**	-	**1.08E+01**	-	Target indoor air concentration based on cancer risk (unit risk factor)	
	(ppbv)		**1.59E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**1.16E+02**	**1.1E+02 - 2.9E+02**	**9.35E+01**	**1.1E+02 - 2.9E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.2-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.2E-05 - 2.3E-04	0.0002	7.2E-05 - 2.3E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input **Site Name/Run Number:** Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.2-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.2-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6
Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-06	1.00E-06	NA	NA		
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.2-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.2E-05 - 2.3E-04	**2.1E-04**	7.2E-05 - 2.3E-04		

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.6E-04	-	9.5E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.3E-04	-	2.3E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile

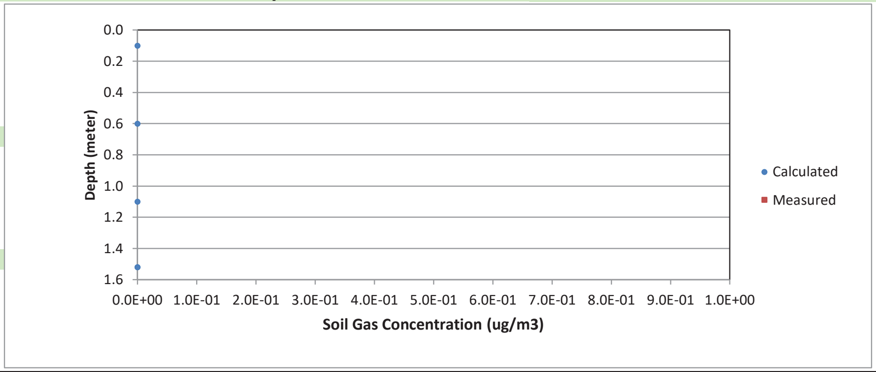


Table F.2-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-6)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	Scenario: Residential							
Target risk for carcinogens	(-)	Target_CR	1E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E-01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-02**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.70E+00**	**6.2E+00 - 2.0E+01**	**5.54E+00**	**6.3E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	3.8E-05	2.8E-05 - 3.8E-05	0.0000	2.7E-05 - 3.8E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.3-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.3-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.3-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output — **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.8E-05**	2.8E-05 - 3.8E-05	**3.7E-05**	2.7E-05 - 3.8E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.0E-03	-	1.0E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.8E-05	-	3.8E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.0E+03	3.5E+01 - 1.7E+04	1.0E+03	3.5E+01 - 1.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

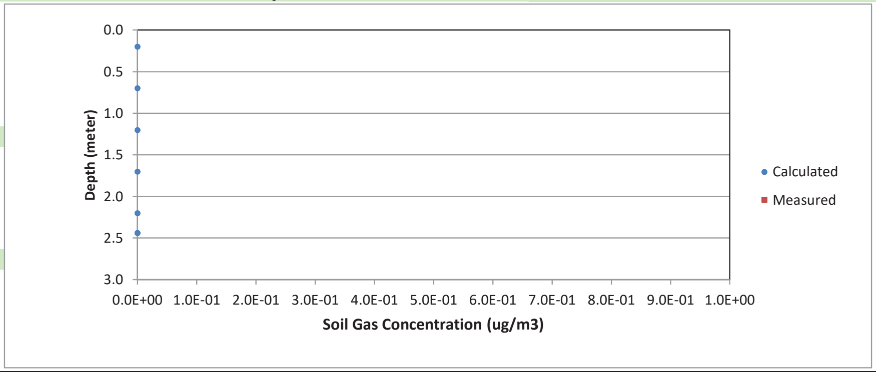
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels	**Scenario: Commercial**							
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.75E+02**	-	**4.72E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**2.58E+01**	-	**6.96E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.898E+03**	**7.8E+03 - 1.1E+04**	**1.72E+03**	**2.1E+03 - 2.9E+03**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.3E-05	3.5E-05 - 5.4E-05	0.0001	3.5E-05 - 5.4E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.3-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.3E-05**	3.5E-05 - 5.4E-05	**5.3E-05**	3.5E-05 - 5.4E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.4E-05	-	5.4E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

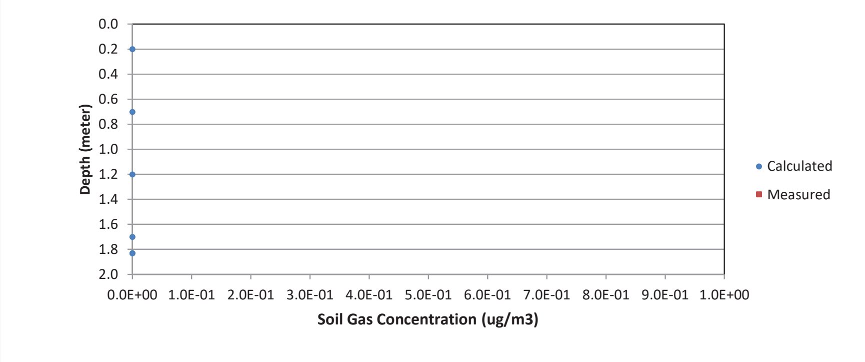
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output — **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels — **Scenario: Commercial**								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+01**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E+00**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.20E+03**	**2.2E+03 - 3.3E+03**	**9.46E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.4E-05	3.6E-05 - 5.5E-05	0.0001	3.6E-05 - 5.5E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^oC	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^oC	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.3-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.4E-05**	3.6E-05 - 5.5E-05	**5.4E-05**	3.6E-05 - 5.5E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.0E-04	-	8.9E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.5E-05	-	5.5E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

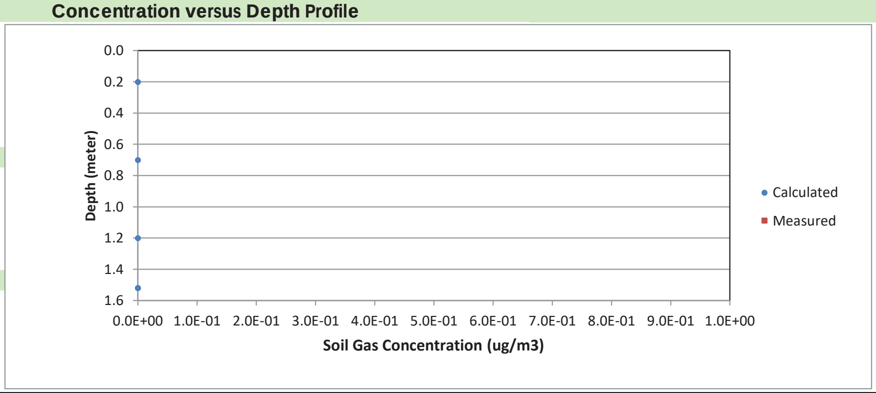
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+01**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E+00**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.16E+03**	**2.1E+03 - 3.3E+03**	**9.26E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.5E-04	6.2E-05 - 1.6E-04	0.0001	6.2E-05 - 1.6E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.3-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4
Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	5.00E-06	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	0.5	1	NA	NA	WARNING	Value is different from default value; please justify.
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.3-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.5E-04**	6.2E-05 - 1.6E-04	**1.5E-04**	6.2E-05 - 1.6E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.6E-04	-	1.6E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

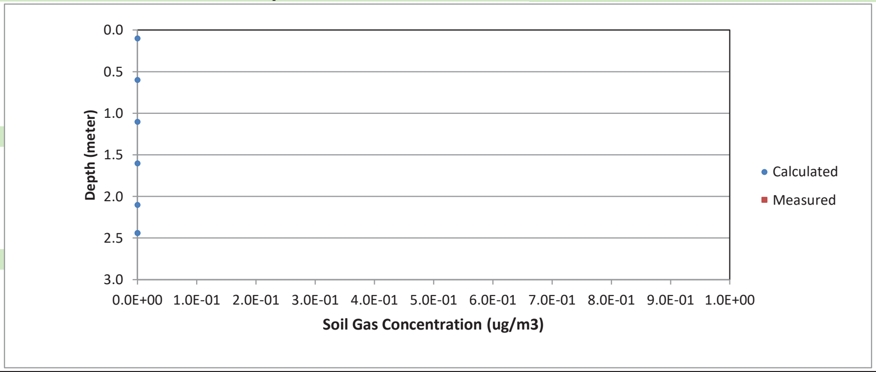
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	5E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	0.5	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.09E+01**	-	**1.08E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**3.08E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.37E+02**	**2.3E+02 - 5.7E+02**	**9.92E+01**	**1.2E+02 - 3.0E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	5.00E-06	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	0.5	1	NA	NA	WARNING	Value is different from default value; please justify.
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output

Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

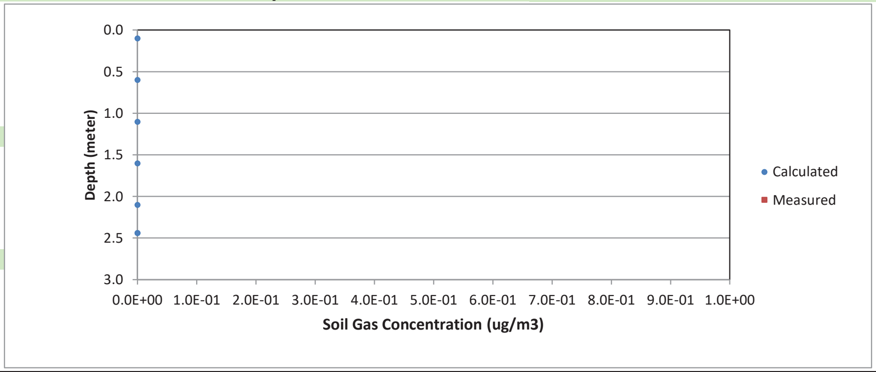
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	5E-06	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	0.5	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.39E+00**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**4.45E-01**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**3.55E+01**	**3.3E+01 - 1.0E+02**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

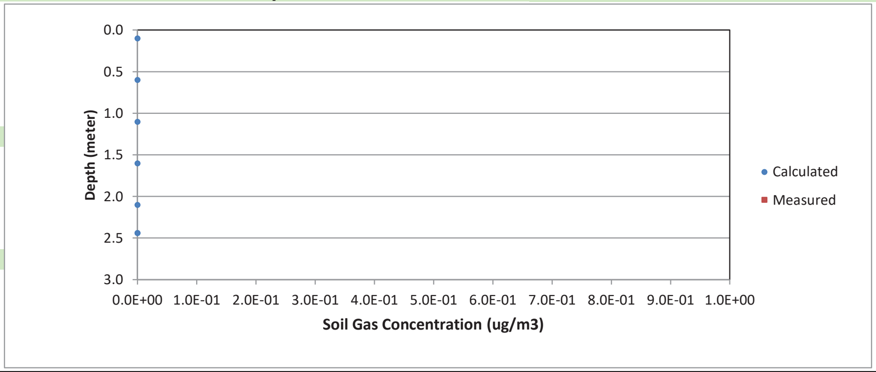
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+00**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-01**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+01**	**6.7E+01 - 2.0E+02**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.1E-05 - 2.2E-04	0.0002	7.1E-05 - 2.2E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.1E-05 - 2.2E-04	**2.1E-04**	7.1E-05 - 2.2E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-04	-	2.2E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

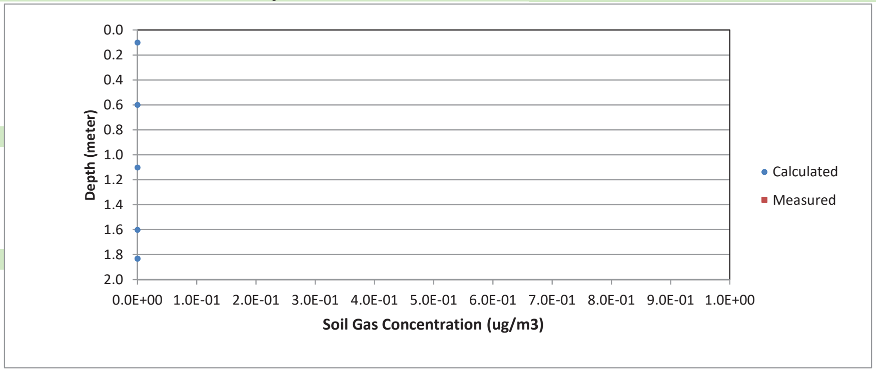
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels — Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+00**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-01**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.83E+01**	**6.4E+01 - 2.0E+02**	**5.65E+00**	**6.4E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.6E-04	6.3E-05 - 1.7E-04	0.0002	6.3E-05 - 1.7E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.3-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input Site Name/Run Number: Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4
Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.3-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.6E-04**	6.3E-05 - 1.7E-04	**1.6E-04**	6.3E-05 - 1.7E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	7.0E-04	-	7.0E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.7E-04	-	1.7E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

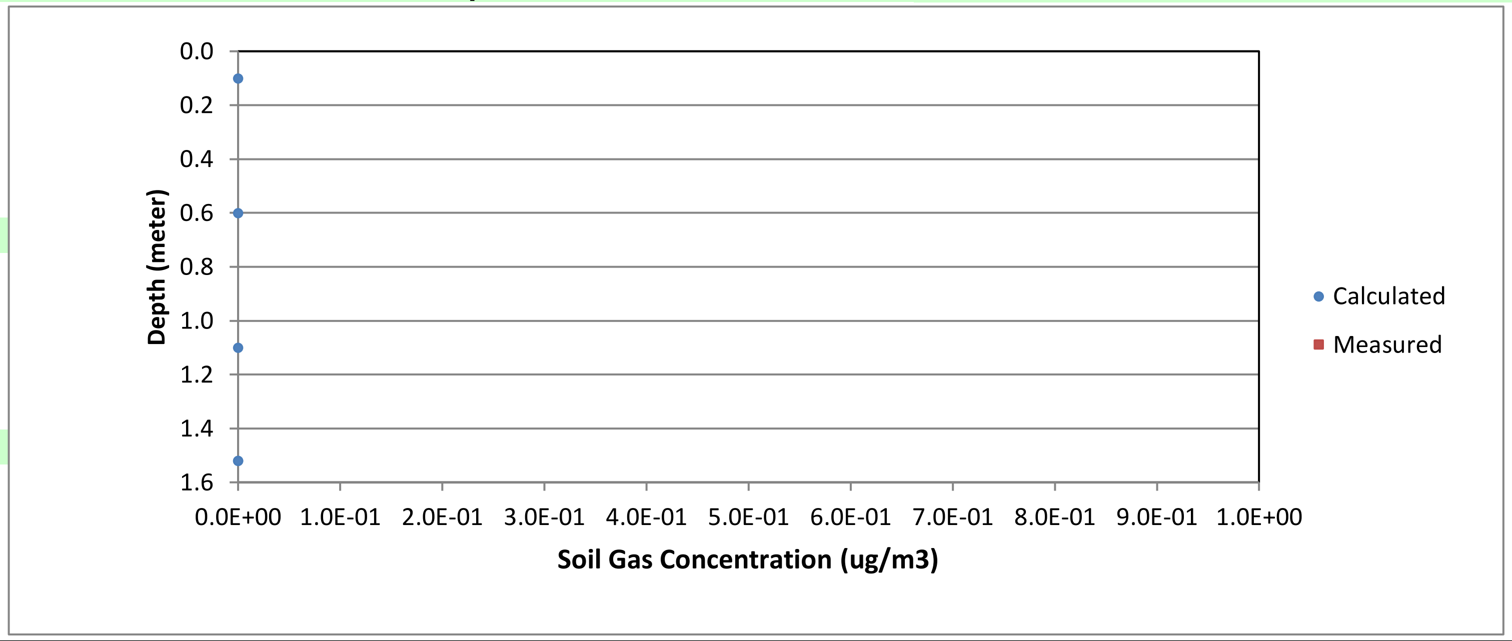
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.3-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels **Scenario: Residential**								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.17E+01**	-	**1.08E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**6.15E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**4.47E+02**	**4.2E+02 - 1.1E+03**	**9.35E+01**	**1.1E+02 - 2.9E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.3-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.2E-05 - 2.3E-04	0.0002	7.2E-05 - 2.3E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(°C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25°C	$(atm\text{-}m^3/mol)$	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25°C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.3-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.3-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.3-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-5)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.2E-05 - 2.3E-04	**2.1E-04**	7.2E-05 - 2.3E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.6E-04	-	9.5E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.3E-04	-	2.3E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

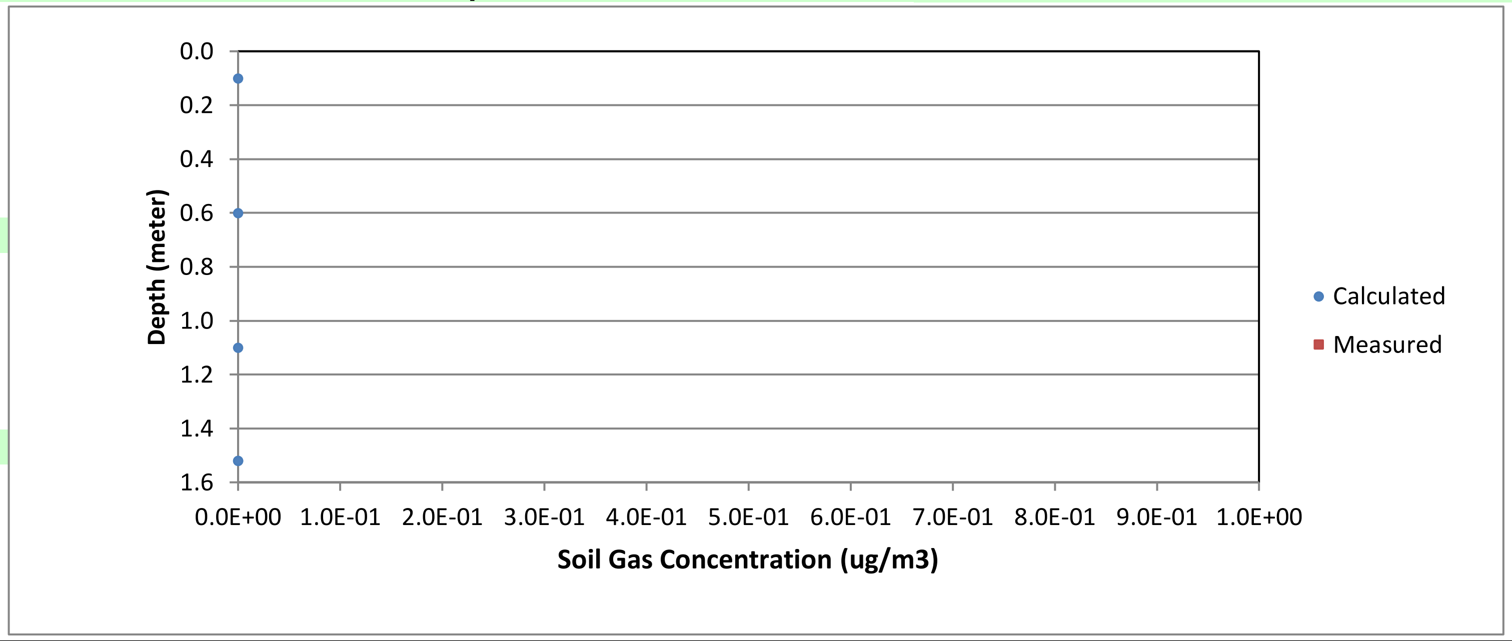
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Trichloroethylene
0.000001

Model Output Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+00**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E-01**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.70E+01**	**6.2E+01 - 2.0E+02**	**5.54E+00**	**6.3E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	3.8E-05	2.8E-05 - 3.8E-05	0.0000	2.7E-05 - 3.8E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.4-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.4-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.4-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output Site Name/Run Number: Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**3.8E-05**	2.8E-05 - 3.8E-05	**3.7E-05**	2.7E-05 - 3.8E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.0E-03	-	1.0E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	3.8E-05	-	3.8E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.0E+03	3.5E+01 - 1.7E+04	1.0E+03	3.5E+01 - 1.7E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

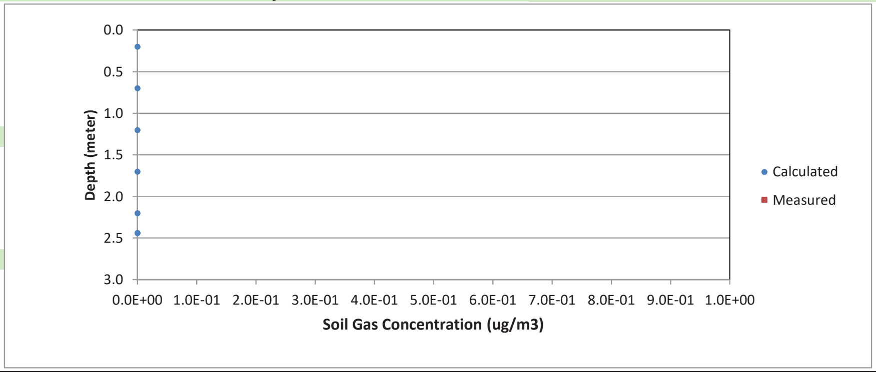
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-1
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels **Scenario: Commercial**								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**1.75E+02**	-	**4.72E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**2.58E+01**	-	**6.96E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.898E+03**	**7.8E+03 - 1.1E+04**	**1.72E+03**	**2.1E+03 - 2.9E+03**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.3E-05	3.5E-05 - 5.4E-05	0.0001	3.5E-05 - 5.4E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^oC	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^oC	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (selected) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.4-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.3E-05**	3.5E-05 - 5.4E-05	**5.3E-05**	3.5E-05 - 5.4E-05	WARNING	Please review warning messages
Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages
Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.4E-05	-	5.4E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

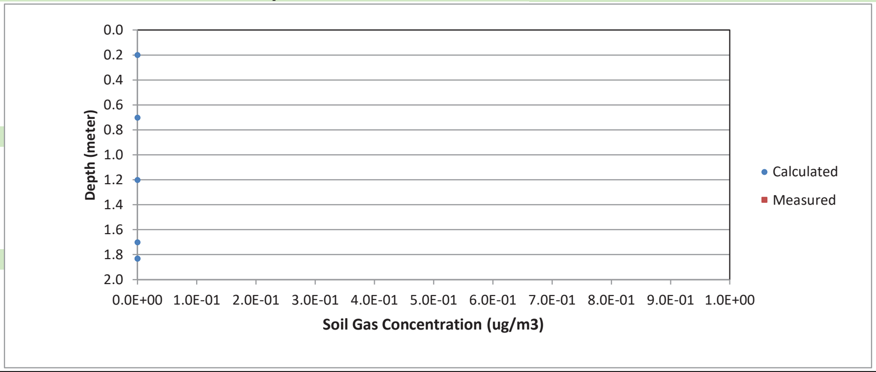
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-2
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Industrial Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+02**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E+01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.20E+04**	**2.2E+04 - 3.3E+04**	**9.46E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	5.4E-05	3.6E-05 - 5.5E-05	0.0001	3.6E-05 - 5.5E-05
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Commercial	Commercial				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.20	0.20	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.20	0.20	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	1500.00	1500.00	80-1000	NA	WARNING	Value is outside of reasonable range (80 - 200 m2).
Enclosed space mixing height	(m)	Hb	3.00	3.00	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	1.50	1.50	.3-4.1	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	6750.00	6750.00	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	20.25	20.25	NA	NA		

Table F.4-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Commercial	Commercial				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	25	25	NA	NA		
Exposure duration	(yrs)	ED	25	25	NA	NA		
Exposure frequency	(days/yr)	EF	250	250	NA	NA		
Exposure time	(hrs/24 hrs)	ET	8	8	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**5.4E-05**	3.6E-05 - 5.5E-05	**5.4E-05**	3.6E-05 - 5.5E-05	WARNING	Please review warning messages

Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.0E-04	-	8.9E-04	-		

Critical Parameters		**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	5.5E-05	-	5.5E-05		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	7.7E+02	2.6E+01 - 1.3E+04	7.7E+02	2.6E+01 - 1.3E+04	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

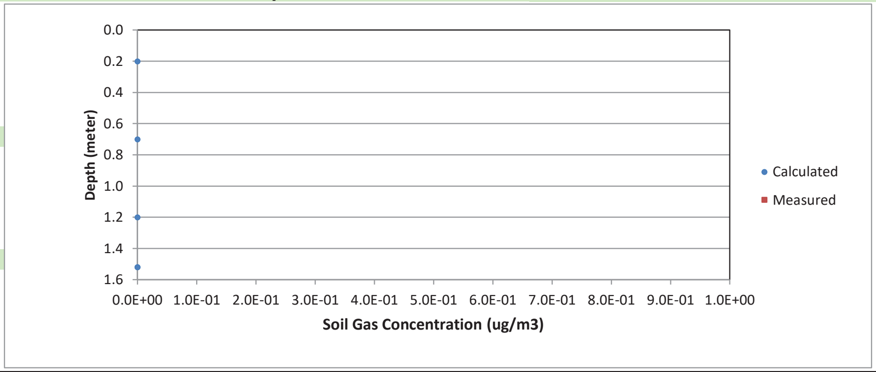
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-3
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Indutrial Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0

Model Output Site Name/Run Number: Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Commercial								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**3.96E+02**	-	**2.05E+00**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**7.36E+01**	-	**3.82E-01**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.16E+04**	**2.1E+04 - 3.3E+04**	**9.26E+01**	**1.1E+02 - 1.7E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.5E-04	6.2E-05 - 1.6E-04	0.0001	6.2E-05 - 1.6E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.4-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No.** 127-18-4

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	5.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	0.5	1	NA	NA	WARNING	Value is different from default value; please justify.
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.4-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Output **Site Name/Run Number:** Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.5E-04**	6.2E-05 - 1.6E-04	**1.5E-04**	6.2E-05 - 1.6E-04	WARNING	Please review warning messages
Predicted Indoor Air Concentration	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages
Predicted Vapor Conc. Beneath Foundation	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
Diffusive Transport Upward Through Vadose Zone	**Units**	**Symbol**	**Value**	**Range**	**Default**	**Default Range**	**Flag**	**Comment**
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.6E-04	-	1.6E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

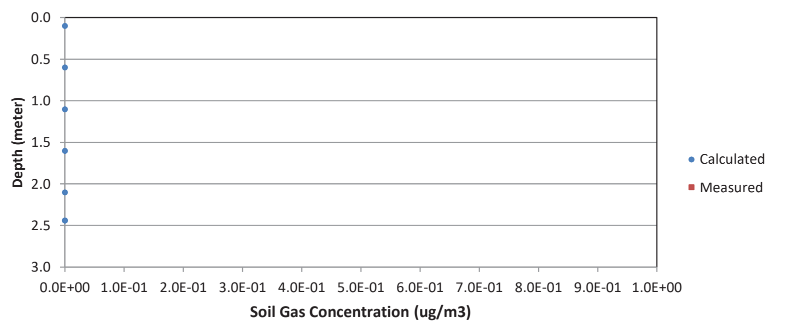
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-4
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	5E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	0.5	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.09E+01**	-	**1.08E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**3.08E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**2.37E+02**	**2.3E+02 - 5.7E+02**	**9.92E+01**	**1.2E+02 - 3.0E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^oC)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^oC	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^oC	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No.** 79-01-6

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	5.00E-05	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	0.5	1	NA	NA	WARNING	Value is different from default value; please justify.
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

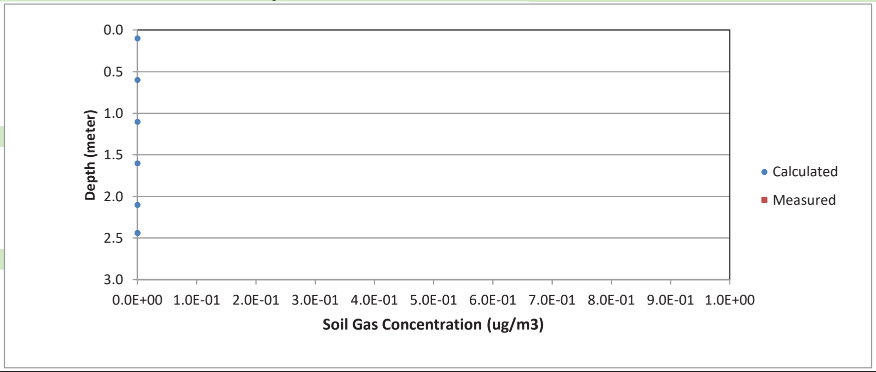
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-5
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel A)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels **Scenario: Residential**								
Target risk for carcinogens	(-)	Target_CR	5E-05	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	0.5	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**2.39E+01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**4.45E+00**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**3.55E+02**	**3.3E+02 - 1.0E+03**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.0E-04	7.0E-05 - 2.1E-04	0.0002	7.0E-05 - 2.1E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	2.44		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No. 79-01-6**

Depth below grade to water table: 2.44 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	2.44					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.0E-04**	7.0E-05 - 2.1E-04	**2.0E-04**	7.0E-05 - 2.1E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.5E-03	-	1.5E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.1E-04	-	2.1E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

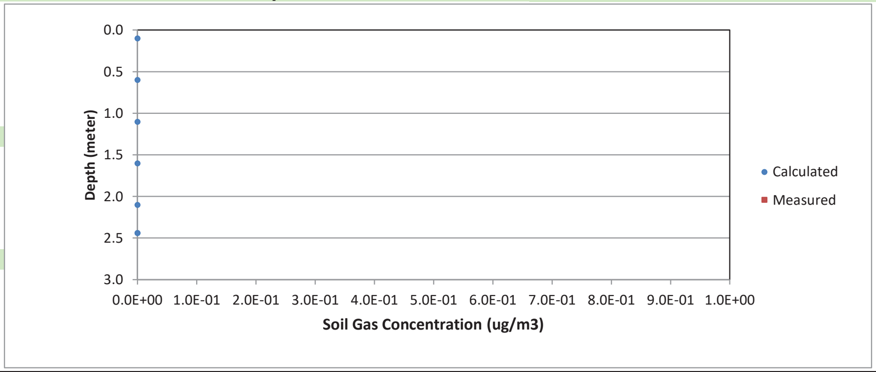
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-6
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel D)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E+00**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**7.10E+02**	**6.7E+02 - 2.0E+03**	**5.87E+00**	**6.7E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.1E-05 - 2.2E-04	0.0002	7.1E-05 - 2.2E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.83		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	(ug/m^3)$^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Model Input

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene **CAS No.** 79-01-6

Depth below grade to water table: 1.83 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.83					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**2.1E-04**	7.1E-05 - 2.2E-04	**2.1E-04**	7.1E-05 - 2.2E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	1.1E-03	-	1.1E-03	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.2E-04	-	2.2E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

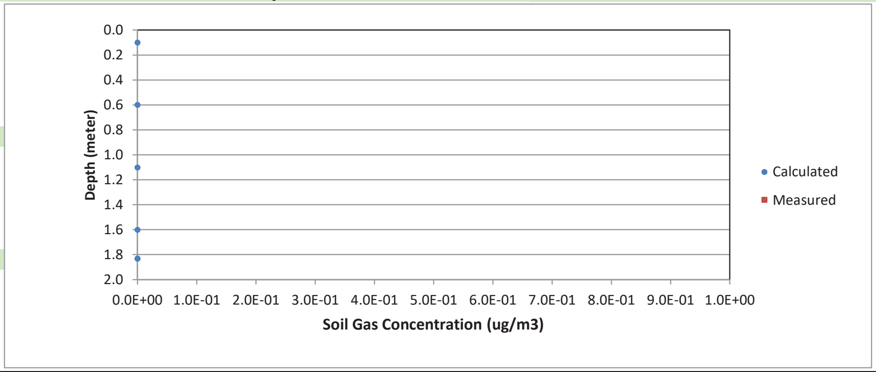
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-7
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel E)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E+00**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.83E+02**	**6.4E+02 - 2.0E+03**	**5.65E+00**	**6.4E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	1.6E-04	6.3E-05 - 1.7E-04	0.0002	6.3E-05 - 1.7E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Tetrachloroethylene					
CAS No.		CAS	127-18-4					
Toxicity Factors								
Unit risk factor	(ug/m^{3})$^{-1}$	IUR	2.60E-07	2.60E-07	NA	NA		
Mutagenic compound		Mut	No	NA	NA	NA		
Reference concentration	(mg/m^{3})	RfC	4.00E-02	4.00E-02	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	2.06E+02	2.06E+02	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^{3}/mol)	Hc	1.77E-02	1.77E-02	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	7.24E-01	7.24E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	5.91E-01	7.34E-01				
Diffusivity in air	(cm2/s)	Dair	5.05E-02	5.05E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	9.46E-06	9.46E-06	NA	NA		

Table F.4-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4
Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA	NOTE	MMOAF not relevant for non-mutagenic compounds

Table F.4-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Model Output

Site Name/Run Number: Example, Run 1

Chemical Name: Tetrachloroethylene **CAS No. 127-18-4**

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	**(-)**	**alpha**	**1.6E-04**	6.3E-05 - 1.7E-04	**1.6E-04**	6.3E-05 - 1.7E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	**Cia**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	**Css**	**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		
	(ppbv)		**0.0E+00**	0.0E+00 - 0.0E+00	**0.0E+00**	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	7.0E-03	-	7.0E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.0E-04	-	1.0E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	7.0E-04	-	7.0E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	1.7E-04	-	1.7E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	1.3E+02	4.2E+00 - 2.1E+03	1.3E+02	4.2E+00 - 2.1E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

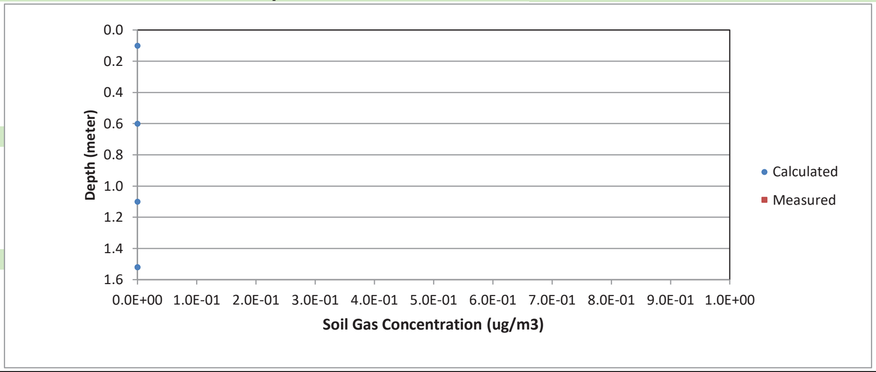
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-8
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Tetrachloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Tetrachloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Tetrachloroethylene CAS No. 127-18-4

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels — Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.17E+01**	-	**1.08E+01**	-	Target indoor air concentration based on non-cancer toxicity (reference concentration)	
	(ppbv)		**6.15E+00**	-	**1.59E+00**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**4.47E+02**	**4.2E+02 - 1.1E+03**	**9.35E+01**	**1.1E+02 - 2.9E+02**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

Table F.4-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Preview	Unit	Value	Range	Default	Default Range
Groundwater to indoor air attenuation coefficient	(-)	2.1E-04	7.2E-05 - 2.3E-04	0.0002	7.2E-05 - 2.3E-04
Predicted indoor air concentration due to vapor intrusion	(ug/m3)	0.000E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00
Please check WARNING or ERROR flags	(ppbv)	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00

Model Input

Site Name/Run Number: Example, Run 1

Note:
-Yellow highlighted cells indicate parameters that typically are changed or must be inputted by the user.
-Dotted outline cells indicate default values that may be changed with justification.
-Toxicity values are taken from Regional Screening Level tables. These tables are updated semi-annually and may not reflect the most current toxicity information.

Use English / Metric Converter

Source Characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Source medium		Source	Groundwater					
Groundwater concentration	(ug/L)	Cmedium			NA			Please enter a value for Cmedium
Depth below grade to water table	(m)	Ls	1.52		Vary - 50	NA		
Average groundwater temperature	(^{o}C)	Ts	21	25	3 - 25			
Calc: Source vapor concentration	(ug/m3)	Cs	0					
Calc: % of pure component saturated vapor concentration	(%)	%Sat	0.000%					

Chemical:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Chemical Name		Chem	Trichloroethylene					
CAS No.		CAS	79-01-6					
Toxicity Factors								
Unit risk factor	$(ug/m^3)^{-1}$	IUR	4.10E-06	4.10E-06	NA	NA		
Mutagenic compound		Mut	Yes	NA	NA	NA		
Reference concentration	(mg/m^3)	RfC	2.00E-03	2.00E-03	NA	NA		

Chemical Properties:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Pure component water solubility	(mg/L)	S	1.28E+03	1.28E+03	NA	NA		
Henry's Law Constant @ 25^{o}C	(atm-m^3/mol)	Hc	9.85E-03	9.85E-03	NA	NA		
Calc: Henry's Law Constant @ 25^{o}C	(dimensionless)	Hr	4.03E-01	4.03E-01				
Calc: Henry's Law Constant @ system temperature	(dimensionless)	Hs	3.36E-01	4.08E-01				
Diffusivity in air	(cm2/s)	Dair	6.87E-02	6.87E-02	NA	NA		
Diffusivity in water	(cm2/s)	Dwater	1.02E-05	1.02E-05	NA	NA		

Table F.4-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Building Characteristics:

Select Building Assumptions

- (●) Use ratio for Qsoil/Qbuilding (recommended if no site specific data available)
- ( ) Specify Qsoil and Qbuilding separately; calculate ratio

	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Building setting		Bldg_Setting	Residential	Residential				
Foundation type		Found_Type	Slab-on-grade	Slab-on-grade				
Depth below grade to base of foundation	(m)	Lb	0.10	0.10	0.1 - 2.44	NA		
Foundation thickness	(m)	Lf	0.10	0.10	0.1 - 0.25	NA		
Fraction of foundation area with cracks	(-)	eta	0.001	0.001	0.00019-0.0019	1.00		
Enclosed space floor area	(m2)	Abf	150.00	150.00	80 - 200	NA		
Enclosed space mixing height	(m)	Hb	2.44	2.44	2.13 - 3.05	NA		
Indoor air exchange rate	(1 / hr)	ach	0.45	0.45	.15-1.26	NA		
Qsoil/Qbuilding	(-)	Qsoil_Qb	0.0030	0.0030	0.0001 - 0.05	1.24		
Calc: Building ventilation rate	(m3/hr)	Qb	164.70	164.70	NA	0.30		
Calc: Average vapor flow rate into building	(m3/hr)	Qsoil	0.49	0.49	NA	NA		

Table F.4-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Input **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6
Depth below grade to water table: 1.52 meters

Vadose zone characteristics:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Stratum A (Top of soil profile):								
Stratum A SCS soil type		SCS_A	Loamy Sand					
Stratum A thickness (from surface)	(m)	hSA	1.52					
Stratum A total porosity	(-)	nSA	0.390	0.390	NA	0.20		
Stratum A water-filled porosity	(-)	nwSA	0.076	0.076	0.049 - 0.1	0.25		
Stratum A bulk density	(g/cm^3)	rhoSA	1.620	1.620	NA	0.05		
Stratum B (Soil layer below Stratum A):								
Stratum B SCS soil type		SCS_B	Not Present					
Stratum B thickness	(m)	hSB	0.00					
Stratum B total porosity	(-)	nSB			NA	NA		
Stratum B water-filled porosity	(-)	nwSB			NA	NA		
Stratum B bulk density	(g/cm^3)	rhoSB			NA	NA		
Stratum C (Soil layer below Stratum B):								
Stratum C SCS soil type		SCS_C	Not Present					
Stratum C thickness	(m)	hSC	0.00					
Stratum C total porosity	(-)	nSC			NA	NA		
Stratum C water-filled porosity	(-)	nwSC			NA	NA		
Stratum C bulk density	(g/cm^3)	rhoSC			NA	NA		
Stratum directly above the water table								
Stratum A, B, or C		src_soil	Stratum A					
Height of capillary fringe	(m)	hcz	0.188	0.188	NA	NA		
Capillary zone total porosity	(-)	ncz	0.390	0.390	NA	0.20		
Capillary zone water filled porosity	(-)	nwcz	0.303	0.303	NA	0.22		

Exposure Parameters:	Units	Symbol	Value	Default	Potential Span	CV	Flag	Comment
Target risk for carcinogens	(-)	Target_CR	1.00E-04	1.00E-06	NA	NA	WARNING	Value is different from default value; please justify.
Target hazard quotient for non-carcinogens	(-)	Target_HQ	1	1	NA	NA		
Exposure Scenario		Scenario	Residential	Residential				
Averaging time for carcinogens	(yrs)	ATc	70	70	NA	NA		
Averaging time for non-carcinogens	(yrs)	ATnc	26	26	NA	NA		
Exposure duration	(yrs)	ED	26	26	NA	NA		
Exposure frequency	(days/yr)	EF	350	350	NA	NA		
Exposure time	(hrs/24 hrs)	ET	24	24	NA	NA		
Mutagenic mode-of-action factor	(yrs)	MMOAF	72	72	NA	NA		MMOAF used in place of ED in risk calculations

Table F.4-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Model Output Site Name/Run Number: Example, Run 1

Chemical Name: Trichloroethylene CAS No. 79-01-6

Range is based on the reasonable range of Qsoil/Qbuilding values, as reported in the literature.

Source to Indoor Air Attenuation Factor	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Groundwater to indoor air attenuation coefficient	(-)	alpha	2.1E-04	7.2E-05 - 2.3E-04	2.1E-04	7.2E-05 - 2.3E-04	WARNING	Please review warning messages

Predicted Indoor Air Concentration	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Indoor air concentration due to vapor intrusion	(ug/m3)	Cia	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		
	(ppbv)		0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00	WARNING	Please review warning messages

Predicted Vapor Conc. Beneath Foundation	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Subslab vapor concentration	(ug/m3)	Css	0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		
	(ppbv)		0.0E+00	0.0E+00 - 0.0E+00	0.0E+00	0.0E+00 - 0.0E+00		

Diffusive Transport Upward Through Vadose Zone	Units	Symbol	Value	Range	Default	Default Range	Flag	Comment
Effective diffusion coefficient through Stratum A	(cm2/sec)	DeffA	9.5E-03	-	9.5E-03	-		
Effective diffusion coefficient through Stratum B	(cm2/sec)	DeffB		-		-		
Effective diffusion coefficient through Stratum C	(cm2/sec)	DeffC		-		-		
Effective diffusion coefficient through capillary zone	(cm2/sec)	DeffCZ	1.4E-04	-	1.4E-04	-		
Effective diffusion coefficient through unsaturated zone	(cm2/sec)	DeffT	9.6E-04	-	9.5E-04	-		

Critical Parameters		Symbol	Value	Range	Default	Default Range	Flag
α for diffusive transport from source to building with dirt floor foundation	(-)	A_Param	2.3E-04	-	2.3E-04		
Pe (Peclet Number) for transport through the foundation (advection / diffusion)	(-)	B_Param	9.3E+01	3.1E+00 - 1.5E+03	9.3E+01	3.1E+00 - 1.5E+03	
α for convective transport from subslab to building	(-)	C_Param	3.0E-03	1.0E-04 - 5.0E-02	3.0E-03	1.0E-04 - 5.0E-02	

Interpretation

Advection is the dominant mechanism across the foundation.
Diffusion through soil is the overall rate limiting process.

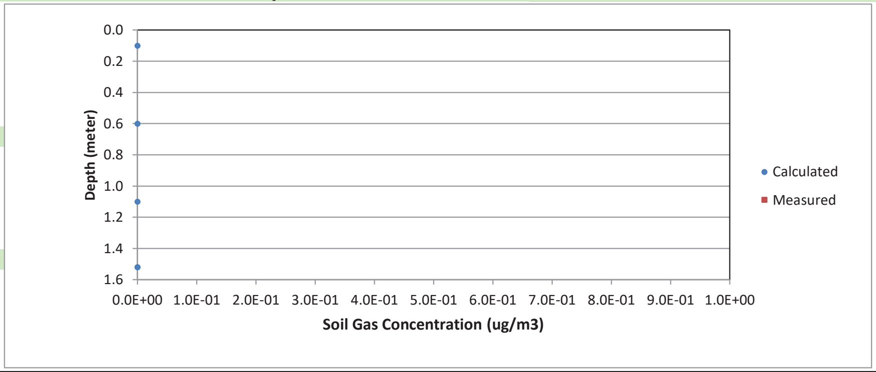
Critical Parameters

Hb, Ls, DeffT, ach

Non-Critical Parameters

Qsoil_Qb, Lf, DeffA, eta

Concentration versus Depth Profile



Please check WARNING or ERROR flags

Table F.4-9
Johnson and Ettinger Model Input and Output (For Deriving SSSLs Based on Risk of 10-4)
Future Residential Scenario - Trichloroethene (Parcel F)
Alabama Army National Guard
Mobile, Alabama

Trichloroethylene
0.000001

Model Output **Site Name/Run Number:** Example, Run 1
Chemical Name: Trichloroethylene CAS No. 79-01-6

Risk Calculations	Units	Symbol	Value	Range	Default	Range	Flag	Comment
Risk-Based Target Screening Levels Scenario: Residential								
Target risk for carcinogens	(-)	Target_CR	1E-04	-	1E-06	-		
Target hazard quotient for noncarcinogens	(-)	Target_HQ	1	-	1	-		
Target indoor air concentration	**(ug/m3)**	**Target_IA**	**4.78E+01**	-	**4.78E-01**	-	Target indoor air concentration based on both cancer risk and non-cancer toxicity	
	(ppbv)		**8.91E+00**	-	**8.91E-02**	-		
Target groundwater concentration	**(ug/L)**	**Target_GW**	**6.70E+02**	**6.2E+02 - 2.0E+03**	**5.54E+00**	**6.3E+00 - 2.0E+01**		
Incremental Risk Estimates								
Incremental cancer risk from vapor intrusion	**(-)**	**Cancer_Risk**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**	Note: biodegradation not included in this model, may over estimate indoor air concentrations.	
Hazard quotient from vapor intrusion	**(-)**	**HQ**	**0.00E+00**	**0.0E+00 - 0.0E+00**	**0.00E+00**	**0.0E+00 - 0.0E+00**		

APPENDIX G

DEVELOPMENT OF SITE-SPECIFIC SCREENING LEVELS

(Provided on CD)

Table G.1-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C (K)	T_C Ref
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	8.00E-03	A /Subchronic	4.07E-02	A /Subchronic	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS

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Table G.1-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
Tetrachloroethylene	127-18-4	VOC	5.05E-02	9.46E-06	2.41E-03	1.36E+09	-	-	5.09E+02	1.18E+04	-	6.01E+02	5.72E+02	2.72E+03	-	8.71E+01	8.44E+01	8.44E+01 nc

Table G.1-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Industrial Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Inhalation Unit Risk $(ug/m^3)^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC $(atm\text{-}m^3/mole)$	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point T_{boil} (K)	BP Ref	Critical Temperature T_{crit} (K)	T_{crit} Ref	CHEMTYPE	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03

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Table G.1-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)	Ingestion SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
5.66E+09	2.79E+03	3.11E+03	1.32E+02	1.26E+02	1.40E+04	4.89E+02	4.72E+02	1.26E+02 ca**

Output generated 25JUL2018:16:57:18

Table G.1-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile; R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	Ingestion SF (mg/kg-day)$^{-1}$	SFO Ref	Inhalation Unit Risk (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point T_{boil} (K)	BP Ref	Critical Temperature T_{crit} (K)	T_{crit} Ref	CHEMTYPE	D_{ia} (cm^2/s)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	U	2.60E-07	U	6.00E-03	U	4.00E-02	U	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.69E-01	1.77E-02	7.24E-01	U	3.94E+02	U	6.20E+02	U	VOC	5.05E-02

Output generated 25JUL2018:16:54:23

Table G.1-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #29); H = HEAST; F = See FAQ; E = see user guide Section 2.3.5; W = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; c = cancer; n = noncancer; * = where: n SL < 100X c SL; ** = where n SL < 10X c SL; SSL values are based on DAF=1; m = Concentration may exceed ceiling limit (See User Guide); s = Concentration may exceed Csat (See User Guide); U = User-provided

D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)	Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
9.46E-06	2.41E-03	5.66E+09	2.79E+03	3.31E+02	-	3.01E+01	2.76E+01	4.69E+02	-	1.16E+02	9.33E+01	5.01E+03	-	1.16E+02	1.14E+02	2.76E+01 ca**

Output generated 25JUL2018:16:54:23

Table G.1-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	K_p (cm/hr)	MW	B (unitless)	t^*(hr)	τ_{event}(hr/event)	FA (unitless)	In EPD?	$DA_{event\ (ca)}$	$DA_{event\ (nc\ child)}$	$DA_{event\ (nc\ adult)}$	MCL (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	No	Yes	Organics	-		-		2.00E-03	I	-		1.00E+00	1.10E-02	9.69E+01	4.17E-02	8.81E-01	3.67E-01	1.00E+00	Yes	-	4.92E-03	8.49E-03	7.00E+01
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	3.34E-02	1.66E+02	1.65E-01	2.14E+00	8.92E-01	1.00E+00	Yes	4.66E-03	1.47E-02	2.55E-02	5.00E+00
Trichloroethylene	79-01-6	Yes	Yes	Organics	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1.00E+00	1.16E-02	1.31E+02	5.11E-02	1.37E+00	5.72E-01	1.00E+00	Yes	1.48E-04	1.23E-03	2.12E-03	5.00E+00
Vinyl Chloride	75-01-4	Yes	Yes	Organics	7.20E-01	I	4.40E-06	I	3.00E-03	I	8.00E-02	A	1.00E+00	8.38E-03	6.25E+01	2.55E-02	5.65E-01	2.35E-01	1.00E+00	Yes	2.64E-06	7.37E-03	1.27E-02	2.00E+00

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Table G.1-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Ingestion SL TR=1E-06 (ug/L)	Dermal SL TR=1E-06 (ug/L)	Inhalation SL TR=1E-06 (ug/L)	Carcinogenic SL TR=1E-06 (ug/L)	Ingestion SL Child THQ=1 (ug/L)	Dermal SL Child THQ=1 (ug/L)	Inhalation SL Child THQ=1 (ug/L)	Noncarcinogenic SL Child THI=1 (ug/L)	Ingestion SL Adult THQ=1 (ug/L)	Dermal SL Adult THQ=1 (ug/L)	Inhalation SL Adult THQ=1 (ug/L)	Noncarcinogenic SL Adult THI=1 (ug/L)	Screening Level (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	-	-	-	-	4.01E+01	3.63E+02	-	3.61E+01	6.67E+01	5.47E+02	-	5.95E+01	3.61E+01 nc
Tetrachloroethylene	127-18-4	3.71E+01	6.53E+01	2.16E+01	1.13E+01	1.20E+02	2.30E+02	8.34E+01	4.06E+01	2.00E+02	3.47E+02	8.34E+01	5.03E+01	1.13E+01 ca
Trichloroethylene	79-01-6	1.18E+00	7.45E+00	9.57E-01	4.94E-01	1.00E+01	6.89E+01	4.17E+00	2.83E+00	1.67E+01	1.04E+02	4.17E+00	3.23E+00	4.94E-01 ca
Vinyl Chloride	75-01-4	2.14E-02	2.77E-01	3.35E-01	1.88E-02	6.02E+01	8.93E+02	1.67E+02	4.21E+01	1.00E+02	1.29E+03	1.67E+02	5.97E+01	1.88E-02 ca

Table G.1-5a

Dermal Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-6 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	**Fraction absorbed water [1]** (unitless)	**Permeability Constant [2]** (cm/hr)	**Lag Time per Event [3]** (hr/event)	**Time to reach steady state [3]** (hr)	**Event Duration [4]** (hr/event)	**Molecular Weight [2]** (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis [5]** (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	4.0	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	4.0	131.39	0.051

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.1-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.1-5b
Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (SubCh) mg/kg-day	RfCi (SubCh) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	8.00E-03	4.10E-02	1	1.00E-06	1	1	1000	1000	0.02	3527	250	1	80	25,550	365
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.20E-03	1	1.00E-06	1	1	1000	1000	0.02	3527	250	1	80	25,550	365

Notes:
ND = No data available

Table G.1-5c
Calculation of Groundwater SSSLs — Construction Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

	POTENTIAL GROUNDWATER SSSLs - CANCER									POTENTIAL GROUNDWATER SSSLs - NONCANCER								
COPC	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)
	Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL			Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL		
Tetrachloroethene	1.95E+05	1.10E+00	Eq 2		5.97E+03	5.97E+03	3.65E+02	3.43E+02	4.67E+04	2.65E-01	Eq 2		1.43E+03	1.43E+03	5.55E+01	5.34E+01
Trichloroethene	8.89E+03	5.04E-02	Eq 2		8.64E+02	8.64E+02	2.06E+01	2.01E+01	2.92E+03	1.66E-02	Eq 2		2.84E+02	2.84E+02	2.66E+00	2.63E+00

Notes:
(1) Calculated using values from Table G.1-5b.
(2) Calculated using values from Table G.1-5a.
(3) Calculated in Table G.1-7b.
(4) Calculated based on ingestion, dermal, and inhalation SSSLs.

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.
NC = Not calculated -- no toxicity values available

Table G.1-6
Calculation of Acceptable Concentrations in Trench Air — Construction Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	IUR $(ug/m^3)^{-1}$	RfC_i (SubCh) mg/m^3	TR	HQ	ET (hrs/day)	EF (days/yr)	ED (yrs)	CF (ug/mg)	AT-C (hrs)	AT-N (hrs)	Acceptable Concentration in Trench Air	
											Cancer Inhalation (ug/m^3)	Noncancer Inhalation (ug/m^3)
Tetrachloroethene	2.60E-07	4.10E-02	1.00E-06	1	4	250	1	1000	613,200	8760	2.36E+03	3.59E+02
Trichloroethene	4.10E-06	2.20E-03	1.00E-06	1	4	250	1	1000	613,200	8760	1.50E+02	1.93E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater vapors in a trench for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC = Not calculated -- no inhalation toxicity values available

Table G.1-7a
Input Values for Trench Model (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

For Mass-Transfer Coefficients			**For Emission Flux and Concentration in Trench**			**Trench Dimensions**		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	**8**	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kl,O2	0.002	cm/s	CF3	3600	s/hr	Width	**3**	ft
MWO2	32		F	**1**			0.91	m
T	**77**	F	ACH	2	hr-1	Depth	**8**	ft
T	298	K					2.44	m
R	8.20E-05	atm-m^3/mol-K				Ratio: width/depth	0.38	

Notes:
The equations in which these values are used are from the following source:
Virginia Department of Environmental Quality (VDEQ), 2022, Virginia Unified Risk Assessment Model – VURAM User Guide for Risk Assessors.

Table G.1-7b
Calculation of Groundwater SSSLs for Vapors in a Trench -- Construction Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Cancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	2.36E+03	3.65E+02
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.50E+02	2.06E+01

Noncancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	3.59E+02	5.55E+01
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.93E+01	2.66E+00

Notes:

[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[2] Values calculated using inputs from Table G.1-7a and equations contained within the Trench Model (VDEQ, 2022).

[3] Values calculated in Table G.1-6.

[4] Groundwater SSSL for trench vapor pathway = acceptable concentration in trench air / volatilization factor

NC = Not calculated -- no inhalation toxicity values available

Table G.1-8a

Dermal Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-6 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water [1] (unitless)	Permeability Constant [2] (cm/hr)	Lag Time per Event [3] (hr/event)	Time to reach steady state [3] (hr)	Event Duration [4] (hr/event)	Molecular Weight [2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis [5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.71	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.71	131.39	0.051

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.1-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.1-8b
Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1	1.00E-06	1	1	1000	1000	1	950	250	25	80	25550	9125
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1	1.00E-06	1	1	1000	1000	1	950	250	25	80	25550	9125

Notes:

ND = No data available

Table G.1-8c
Calculation of Groundwater SSSLs — Industrial Worker (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

	GROUNDWATER - CANCER									GROUNDWATER - NONCANCER						
COPC	**Cancer Oral (ug/L)**		**Cancer Dermal (ug/L)**					**Ing + Dermal (ug/L)**		**Noncancer Oral (ug/L)**	**Noncancer Dermal (ug/L)**					**Ing + Dermal (ug/L)**
	Oral		**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**			**Oral**	**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**	
Tetrachloroethene	1.56E+02		1.64E-01	Eq 1	2.21E+03		2.21E+03	1.45E+02		7.01E+02	7.38E-01	Eq 1	9.96E+03		9.96E+03	6.55E+02
Trichloroethene	7.11E+00		7.48E-03	Eq 1	3.63E+02		3.63E+02	6.97E+00		5.84E+01	6.15E-02	Eq 1	2.99E+03		2.99E+03	5.73E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the industrial worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC - Not Calculated (No Toxicity Values are available)

Table G.1-9
Calculation of Soil SSSLs — Child (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo (mg/kg-day)$^{-1}$	IUR (ug/m^3)$^{-1}$	RfDo mg/kg-day	RfCi mg/m^3	GIABS	TR	HQ	CF-Air (ug/mg)	CF-Soil (kg/mg)	IR-S (mg/day)	FI	EF (days/yr)	ED (yrs)	BW (kg)	VF (m3/kg)	ET (hrs/day)	AT-C (Hrs)	AT-N (Hrs)	AT-C (days)	AT-N (days)
Tetrachloroethene	NA	NA	6.00E-03	4.00E-02	1	NA	1	1000	1.00E-06	200	1	350	6	15	2790	24	NA	52560	NA	2190

	SOIL - CANCER				SOIL - NONCANCER			
COPC	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING + DER + Inh (mg/kg)	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING+DER +Inh (mg/kg)
Tetrachloroethene	NA	NA	NA	NA	4.6929E+02	-	116	93

Note:
USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to soil for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.
NA - Not Applicable

Table G.1-10a

Dermal Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-6 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water [1] (unitless)	Permeability Constant [2] (cm/hr)	Lag Time per Event [3] (hr/event)	Time to reach steady state [3] (hr)	Event Duration [4] (hr/event)	Molecular Weight [2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis [5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
cis-1,2-Dichloroethene	1.0	0.011	0.37	0.89	0.54	96.944	0.042
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.54	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.54	131.39	0.051

Notes

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.1-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.1-10b
Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo (mg/kg-day)$^{-1}$	IUR (ug/m^3)$^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-N (days)
cis-1,2-Dichloroethene	ND	ND	2.00E-03	ND	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03

Notes:
NA - Not Applicable
ND = No data available

Table G.1-10c
Calculation of Groundwater SSSLs — Resident Child (SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

NONCANCER - GROUNDWATER

COPC	Noncancer Oral (ug/L)	Noncancer Dermal (ug/L)					SSSL: Ing + Dermal (ug/L)
	Oral	**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**	
cis-1,2-Dichloroethene	4.01E+01	4.92E-03	Eq 1	3.61E+02		3.61E+02	3.61E+01
Tetrachloroethene	1.20E+02	1.47E-02	Eq 1	2.28E+02		2.28E+02	7.88E+01
Trichloroethene	1.00E+01	1.23E-03	Eq 1	6.84E+01		6.84E+01	8.75E+00

Notes

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

Table G.1-11
Estimation of DA_{event} - Lag Time per Event (t_{event}) for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

$$\tau_{event} = \frac{l_{sc}^{\,2}}{6 * D_{sc}} = 0.105 * 10^{(0.0056*MW)}$$

Used in calculation for τ_{event} (Equation A.4 in USEPA 2004)	**Molecular Weight**[1] (g/mole)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**Apparent thickness of stratum corneum** (cm)	**Effective Diffusion Coefficient through Stratum Corneum** (cm2/hr)	**Lag Time per Event** (hr/event)
Chemical	MW	Log *Dsc/lsc*	*Dsc / lsc*	*lsc*	*Dsc*	τ_{event}
cis-1,2-Dichloroethene	96.944	-3.349093339	0.000447617	0.001	4.48E-07	0.37
Tetrachloroethene	165.83	-3.735667794	0.000183794	0.001	1.84E-07	0.91
Trichloroethene	131.39	-3.542397402	0.000286815	0.001	2.87E-07	0.58

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table G.1-12
Estimation of DA_{event} - Time to Reach Steady State for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-6 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

If $B \leq 0.6$, then $t^* = 2.4 * \tau_{event}$

If $B > 0.6$, then $t^* = 6 * \tau_{event} (b - \sqrt{b^2 - c^2})$

$b = \frac{2 * (1 + B)^2}{\pi} - c$ $\quad c = \frac{1 + 3B + 3B^2}{3 * (1 + B)}$

Used in calculation for t* **(Equation A.5 or A.6 in USEPA 2004). Also uses Equations A.7 and A.8 for b and c in USEPA 2004.**	**Permeability Constant** [1] (cm/hr)	**Molecular Weight** [1] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis** (unitless)	**Lag Time per Event** (hr/event)	**Formula Used**	**Time to reach steady state** (hr)	**Correlation Coefficients** (unitless)	**Correlation Coefficients** (unitless)
Chemical	Kp	MW	B	τ_{event}	Formula	t*	b	c
cis-1,2-Dichloroethene	0.011	96.944	0.042	0.37	Eq. A.5	0.89	0.33	0.36
Tetrachloroethene	0.0334	165.83	0.165	0.91	Eq. A.5	2.18	0.41	0.45
Trichloroethene	0.0116	131.39	0.051	0.58	Eq. A.5	1.39	0.34	0.37

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table G.2-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C (K)	T_C Ref
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	8.00E-03	A /Subchronic	4.07E-02	A /Subchronic	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS

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Table G.2-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Ingestion SL TR=1E-05 (mg/kg)	Dermal SL TR=1E-05 (mg/kg)	Inhalation SL TR=1E-05 (mg/kg)	Carcinogenic SL TR=1E-05 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
Tetrachloroethylene	127-18-4	VOC	5.05E-02	9.46E-06	2.41E-03	1.36E+09	-	-	5.09E+02	1.18E+05	-	6.01E+03	5.72E+03	2.72E+03	-	8.71E+01	8.44E+01	8.44E+01 nc

Table G.2-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03

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Table G.2-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)	**Ingestion SL TR=1E-05 (mg/kg)**	**Inhalation SL TR=1E-05 (mg/kg)**	**Carcinogenic SL TR=1E-05 (mg/kg)**	**Ingestion SL THQ=1 (mg/kg)**	**Inhalation SL THQ=1 (mg/kg)**	**Noncarcinogenic SL THI=1 (mg/kg)**	**Screening Level (mg/kg)**
5.66E+09	2.79E+03	3.11E+04	1.32E+03	1.26E+03	1.40E+04	4.89E+02	4.73E+02	4.73E+02 sat

Table G.2-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03

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Table G.2-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)	**Ingestion SL TR=1E-05 (mg/kg)**	**Inhalation SL TR=1E-05 (mg/kg)**	**Carcinogenic SL TR=1E-05 (mg/kg)**	**Ingestion SL THQ=1 (mg/kg)**	**Inhalation SL THQ=1 (mg/kg)**	**Noncarcinogenic SL THI=1 (mg/kg)**	**Screening Level (mg/kg)**
5.66E+09	2.79E+03	3.11E+04	1.32E+03	1.26E+03	1.40E+04	4.89E+02	4.73E+02	4.73E+02 sat

Table G.2-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03	5.66E+09	2.79E+03

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Table G.2-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Ingestion SL TR=1E-05 (mg/kg)	Dermal SL TR=1E-05 (mg/kg)	Inhalation SL TR=1E-05 (mg/kg)	Carcinogenic SL TR=1E-05 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)	Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
3.31E+03	-	3.01E+02	2.76E+02	4.69E+02	-	1.16E+02	9.33E+01	5.01E+03	-	1.16E+02	1.14E+02	9.33E+01 nc

Table G.2-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC $(atm\text{-}m^3/mole)$	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03	5.66E+09	2.79E+03

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Table G.2-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific
Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Ingestion SL TR=1E-05 (mg/kg)	Dermal SL TR=1E-05 (mg/kg)	Inhalation SL TR=1E-05 (mg/kg)	Carcinogenic SL TR=1E-05 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)	Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
3.31E+03	-	3.01E+02	2.76E+02	4.69E+02	-	1.16E+02	9.33E+01	5.01E+03	-	1.16E+02	1.14E+02	9.33E+01 nc

Table G.2-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	K_p (cm/hr)	MW	B (unitless)	t^*(hr)	τ_{event}(hr/event)	FA (unitless)	In EPD?	$DA_{event (ca)}$	$DA_{event (nc child)}$	$DA_{event (nc adult)}$	MCL (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	No	Yes	Organics	-		-		2.00E-03	I	-		1.00E+00	1.10E-02	9.69E+01	4.17E-02	8.81E-01	3.67E-01	1.00E+00	Yes	-	4.92E-03	8.49E-03	7.00E+01
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	3.34E-02	1.66E+02	1.65E-01	2.14E+00	8.92E-01	1.00E+00	Yes	4.66E-02	1.47E-02	2.55E-02	5.00E+00
Trichloroethylene	79-01-6	Yes	Yes	Organics	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1.00E+00	1.16E-02	1.31E+02	5.11E-02	1.37E+00	5.72E-01	1.00E+00	Yes	1.48E-03	1.23E-03	2.12E-03	5.00E+00
Vinyl Chloride	75-01-4	Yes	Yes	Organics	7.20E-01	I	4.40E-06	I	3.00E-03	I	8.00E-02	A	1.00E+00	8.38E-03	6.25E+01	2.55E-02	5.65E-01	2.35E-01	1.00E+00	Yes	2.64E-05	7.37E-03	1.27E-02	2.00E+00

Output generated 19FEB2022:17:31:48

Table G.2-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Ingestion SL TR=1E-05 (ug/L)	Dermal SL TR=1E-05 (ug/L)	Inhalation SL TR=1E-05 (ug/L)	Carcinogenic SL TR=1E-05 (ug/L)	Ingestion SL Child THQ=1 (ug/L)	Dermal SL Child THQ=1 (ug/L)	Inhalation SL Child THQ=1 (ug/L)	Noncarcinogenic SL Child THI=1 (ug/L)	Ingestion SL Adult THQ=1 (ug/L)	Dermal SL Adult THQ=1 (ug/L)	Inhalation SL Adult THQ=1 (ug/L)	Noncarcinogenic SL Adult THI=1 (ug/L)	Screening Level (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	-	-	-	-	4.01E+01	3.63E+02	-	3.61E+01	6.67E+01	5.47E+02	-	5.95E+01	3.61E+01 nc
Tetrachloroethylene	127-18-4	3.71E+02	6.53E+02	2.16E+02	1.13E+02	1.20E+02	2.30E+02	8.34E+01	4.06E+01	2.00E+02	3.47E+02	8.34E+01	5.03E+01	4.06E+01 nc
Trichloroethylene	79-01-6	1.18E+01	7.45E+01	9.57E+00	4.94E+00	1.00E+01	6.89E+01	4.17E+00	2.83E+00	1.67E+01	1.04E+02	4.17E+00	3.23E+00	2.83E+00 nc
Vinyl Chloride	75-01-4	2.14E-01	2.77E+00	3.35E+00	1.88E-01	6.02E+01	8.93E+02	1.67E+02	4.21E+01	1.00E+02	1.29E+03	1.67E+02	5.97E+01	1.88E-01 ca

Table G.2-5a

Dermal Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-5 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water [1] (unitless)	Permeability Constant [2] (cm/hr)	Lag Time per Event [3] (hr/event)	Time to reach steady state [3] (hr)	Event Duration [4] (hr/event)	Molecular Weight [2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis [5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	4.0	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	4.0	131.39	0.051

Notes:

(1) Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

(2) Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

(3) Previously calculated on Table G.2-12.

(4) Value obtained from Table 14.

(5) Value estimated using Equation A-1 (USEPA, July 2004).

Table G.2-5b
Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo (mg/kg-day)$^{-1}$	IUR (ug/m^3)$^{-1}$	RfDo (SubCh) mg/kg-day	RfCi (SubCh) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	8.00E-03	4.10E-02	1	1.00E-05	1	1	1000	1000	0.02	3527	250	1	80	25,550	365
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.20E-03	1	1.00E-05	1	1	1000	1000	0.02	3527	250	1	80	25,550	365

Notes:

ND = No data available

Table G.2--5c
Calculation of Groundwater SSSLs — Construction Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

	POTENTIAL GROUNDWATER SSSLs - CANCER								POTENTIAL GROUNDWATER SSSLs - NONCANCER							
COPC	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)
	Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL			Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL		
Tetrachloroethene	1.95E+06	1.10E+01	Eq 2		5.97E+04	5.97E+04	3.65E+03	3.43E+03	4.67E+04	2.65E-01	Eq 2		1.43E+03	1.43E+03	5.55E+01	5.34E+01
Trichloroethene	8.887E+04	5.04E-01	Eq 2		8.64E+03	8.64E+03	2.06E+02	2.01E+02	2.92E+03	1.66E-02	Eq 2		2.84E+02	2.84E+02	2.67E+00	2.64E+00

Notes:

[1] Calculated using values from Table G.2-5b.

[2] Calculated using values from Table G.2-5a.

[3] Calculated in Table G.2-7b.

[4] Calculated based on ingestion, dermal, and inhalation SSSLs.

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC = Not calculated -- no toxicity values available

Table G.2-6
Calculation of Acceptable Concentrations in Trench Air — Construction Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	IUR $(ug/m^3)^{-1}$	RfC_i (SubCh) mg/m^3	TR	HQ	ET (hrs/day)	EF (days/yr)	ED (yrs)	CF (ug/mg)	AT-C (hrs)	AT-N (hrs)	Acceptable Concentration in Trench Air: Cancer Inhalation (ug/m^3)	Acceptable Concentration in Trench Air: Noncancer Inhalation (ug/m^3)
Tetrachloroethene	2.60E-07	4.10E-02	1.00E-05	1	4	250	1	1000	613,200	8760	2.36E+04	3.59E+02
Trichloroethene	4.10E-06	2.20E-03	1.00E-05	1	4	250	1	1000	613,200	8760	1.50E+03	1.93E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater vapors in a trench for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC = Not calculated -- no inhalation toxicity values available

Table G.2-7a
Input Values for Trench Model (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench Dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	**8**	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kl,O2	0.002	cm/s	CF3	3600	s/hr	Width	**3**	ft
MWO2	32		F	**1**			0.91	m
T	**77**	F	ACH	2	hr-1	Depth	**8**	ft
T	298	K					2.44	m
R	8.20E-05	atm-m^3/mol-K				Ratio: width/depth	0.38	

Notes:
The equations in which these values are used are from the following source:
Virginia Department of Environmental Quality (VDEQ), 2022, Virginia Unified Risk Assessment Model – VURAM User Guide for Risk Assessors.

Table G.2-7b
Calculation of Groundwater SSSLs for Vapors in a Trench -- Construction Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Cancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	2.36E+04	3.65E+03
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.50E+03	2.06E+02

Noncancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	3.59E+02	5.55E+01
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.93E+01	2.67E+00

Notes:

[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[2] Values calculated using inputs from Table G.2-7a and equations contained within the Trench Model (VDEQ, 2022).

[3] Values calculated in Table G.2-6.

[4] Groundwater SSSL for trench vapor pathway = acceptable concentration in trench air / volatilization factor

NC = Not calculated -- no inhalation toxicity values available

Table G.2-8a

Dermal Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-5 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water [1] (unitless)	Permeability Constant [2] (cm/hr)	Lag Time per Event [3] (hr/event)	Time to reach steady state [3] (hr)	Event Duration [4] (hr/event)	Molecular Weight [2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis [5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.71	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.71	131.39	0.051

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.2-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.2-8b
Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1	1.00E-05	1	1	1000	1000	1	950	250	25	80	25550	9125
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1	1.00E-05	1	1	1000	1000	1	950	250	25	80	25550	9125

Notes:

ND = No data available

Table G.2-8c
Calculation of Groundwater SSSLs — Industrial Worker (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

GROUNDWATER - CANCER | **GROUNDWATER - NONCANCER**

COPC	Cancer Oral (ug/L)		Cancer Dermal (ug/L)					Ing + Dermal (ug/L)		Noncancer Oral (ug/L)	Noncancer Dermal (ug/L)					Ing + Dermal (ug/L)
	Oral		**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**			**Oral**	**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**	
Tetrachloroethene	1.56E+03		1.64E+00	Eq 1	2.21E+04		2.21E+04	1.45E+03		7.01E+02	7.38E-01	Eq 1	9.96E+03		9.96E+03	6.55E+02
Trichloroethene	7.11E+01		7.48E-02	Eq 1	3.63E+03		3.63E+03	6.97E+01		5.84E+01	6.15E-02	Eq 1	2.99E+03		2.99E+03	5.73E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the industrial worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC - Not Calculated (No Toxicity Values are available)

Table G.2-9
Calculation of Soil SSSLs — Child (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo (mg/kg-day)$^{-1}$	IUR (ug/m^3)$^{-1}$	RfDo mg/kg-day	RfCi mg/m^3	GIABS	TR	HQ	CF-Air (ug/mg)	CF-Soil (kg/mg)	IR-S (mg/day)	FI	EF (days/yr)	ED (yrs)	BW (kg)	VF (m3/kg)	ET (hrs/day)	AT-C (Hrs)	AT-N (Hrs)	AT-C (days)	AT-N (days)
Tetrachloroethene	NA	NA	6.00E-03	4.00E-02	1	NA	1	1000	1.00E-06	200	1	350	6	15	2790	24	NA	52560	NA	2190

	SOIL - CANCER				SOIL - NONCANCER			
COPC	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING + DER + Inh (mg/kg)	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING+DER +Inh (mg/kg)
Tetrachloroethene	NA	NA	NA	NA	4.6929E+02	-	116	93

Note:
USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to soil for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.
NA - Not Applicable

Table G.2-10a
Dermal Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Parameter	Fraction absorbed water [1] (unitless)	Permeability Constant [2] (cm/hr)	Lag Time per Event [3] (hr/event)	Time to reach steady state [3] (hr)	Event Duration [4] (hr/event)	Molecular Weight [2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis [5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
cis-1,2-Dichloroethene	1.0	0.011	0.37	0.89	0.54	96.944	0.042
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.54	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.54	131.39	0.051

Notes

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.1-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.2-10b
Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo (mg/kg-day)$^{-1}$	IUR (ug/m^3)$^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-N (days)
cis-1,2-Dichloroethene	ND	ND	2.00E-03	ND	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03

Notes:
NA - Not Applicable
ND = No data available

Table G.2-10c
Calculation of Groundwater SSSLs — Resident Child (SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

NONCANCER - GROUNDWATER

COPC	Noncancer Oral (ug/L)	Noncancer Dermal (ug/L)					SSSL: Ing + Dermal (ug/L)
	Oral	DAevent	t-event vs. t*	If Eq 1	If Eq 2	Dermal Total	
cis-1,2-Dichloroethene	4.01E+01	4.92E-03	Eq 1	3.61E+02		3.61E+02	3.61E+01
Tetrachloroethene	1.20E+02	1.47E-02	Eq 1	2.28E+02		2.28E+02	7.88E+01
Trichloroethene	1.00E+01	1.23E-03	Eq 1	6.84E+01		6.84E+01	8.75E+00

Notes

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

Table G.2-11
Estimation of DA_{event} - Lag Time per Event (t_{event}) for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

$$\tau_{event} = \frac{l_{sc}^{\,2}}{6 * D_{sc}} = 0.105 * 10^{(0.0056*MW)}$$

Used in calculation for τ_{event} (Equation A.4 in USEPA 2004)	**Molecular Weight** [1] (g/mole)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**EDC for stratum corneum/ Apparent thickness of stratum corneum** (cm/hr)	**Apparent thickness of stratum corneum** (cm)	**Effective Diffusion Coefficient through Stratum Corneum** (cm2/hr)	**Lag Time per Event** (hr/event)
Chemical	MW	Log *Dsc/lsc*	*Dsc / lsc*	*lsc*	*Dsc*	τ_{event}
cis-1,2-Dichloroethene	96.944	-3.349093339	0.000447617	0.001	4.48E-07	0.37
Tetrachloroethene	165.83	-3.735667794	0.000183794	0.001	1.84E-07	0.91
Trichloroethene	131.39	-3.542397402	0.000286815	0.001	2.87E-07	0.58

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table G.2-12
Estimation of DA_{event} - Time to Reach Steady State for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-5 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

If $B \leq 0.6$, then $t^* = 2.4 * \tau_{event}$

If $B > 0.6$, then $t^* = 6 * \tau_{event} (b - \sqrt{b^2 - c^2})$

$b = \frac{2 * (1+B)^2}{\pi} - c$ $\qquad c = \frac{1 + 3B + 3B^2}{3 * (1 + B)}$

Used in calculation for t* **(Equation A.5 or A.6 in USEPA 2004). Also uses Equations A.7 and A.8 for b and c in USEPA 2004.**	**Permeability Constant** [1] (cm/hr)	**Molecular Weight** [1] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis** (unitless)	**Lag Time per Event** (hr/event)	**Formula Used**	**Time to reach steady state** (hr)	**Correlation Coefficients** (unitless)	**Correlation Coefficients** (unitless)
Chemical	Kp	MW	B	τ_{event}	Formula	t*	b	c
cis-1,2-Dichloroethene	0.011	96.944	0.042	0.37	Eq. A.5	0.89	0.33	0.36
Tetrachloroethene	0.0334	165.83	0.165	0.91	Eq. A.5	2.18	0.41	0.45
Trichloroethene	0.0116	131.39	0.051	0.58	Eq. A.5	1.39	0.34	0.37

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table G.3-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	8.00E-03	A /Subchronic	4.07E-02	A /Subchronic

Chemical	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C (K)	T_C Ref
Tetrachloroethylene	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS

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Table G.3-1
RSL Calculator - Construction Worker - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Construction Worker Regional Screening Levels (RSL) for Soil - Other Construction Activities

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Ingestion SL TR=0.0001 (mg/kg)	Dermal SL TR=0.0001 (mg/kg)	Inhalation SL TR=0.0001 (mg/kg)	Carcinogenic SL TR=0.0001 (mg/kg)	Ingestion SL THQ=1 (mg/kg)	Dermal SL THQ=1 (mg/kg)	Inhalation SL THQ=1 (mg/kg)	Noncarcinogenic SL THI=1 (mg/kg)	Screening Level (mg/kg)
Tetrachloroethylene	127-18-4	VOC	5.05E-02	9.46E-06	2.41E-03	1.36E+09	-	-	5.09E+02	1.18E+06	-	6.01E+04	5.72E+04	2.72E+03	-	8.71E+01	8.44E+01	8.44E+01 nc

Table G.3-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03

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Table G.3-2
RSL Calculator - Industrial Worker - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Indoor Worker Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)	**Ingestion SL TR=0.0001 (mg/kg)**	**Inhalation SL TR=0.0001 (mg/kg)**	**Carcinogenic SL TR=0.0001 (mg/kg)**	**Ingestion SL THQ=1 (mg/kg)**	**Inhalation SL THQ=1 (mg/kg)**	**Noncarcinogenic SL THI=1 (mg/kg)**	**Screening Level (mg/kg)**
5.66E+09	2.79E+03	3.11E+05	1.32E+04	1.26E+04	1.40E+04	4.89E+02	4.73E+02	4.73E+02 sat

Table G.3-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Chemical	CAS Number	Mutagen?	Volatile?	SF_o $(mg/kg\text{-}day)^{-1}$	SF_o Ref	IUR $(ug/m^3)^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc} (cm^3/g)	K_d (cm^3/g)	HLC $(atm\text{-}m^3/mole)$	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature TC (K)	TC Ref	Chemical Type	D_{ia} (cm^2/s)	D_{iw} (cm^2/s)	D_A (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor (m^3/kg)
Tetrachloroethylene	127-18-4	No	Yes	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	-	1.00E+00	1.66E+02	2.06E+02	9.49E+01	5.70E-01	1.77E-02	7.24E-01	PHYSPROP	3.94E+02	PHYSPROP	6.20E+02	YAWS	VOC	5.05E-02	9.46E-06	2.41E-03	5.66E+09	2.79E+03

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Table G.3-3
RSL Calculator - Resident Adult - Soil (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Site-specific

Resident Regional Screening Levels (RSL) for Soil

Key: I = IRIS; P = PPRTV; D = DWSHA; O = OPP; A = ATSDR; C = Cal EPA; X = APPENDIX PPRTV SCREEN (See FAQ #31); H = HEAST; F = See FAQ; W = see user guide Section 2.3.5; E = see user guide Section 2.3.6; L = see user guide on lead; M = mutagen; S = see user guide Section 5; V = volatile;
R = RBA applied (See User Guide for Arsenic notice) ; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = Concentration may exceed ceiling limit (See User Guide); sat = Concentration may exceed Csat (See User Guide); U = User-provided

Ingestion SL TR=0.0001 (mg/kg)	Dermal SL TR=0.0001 (mg/kg)	Inhalation SL TR=0.0001 (mg/kg)	Carcinogenic SL TR=0.0001 (mg/kg)	Ingestion SL Child THQ=1 (mg/kg)	Dermal SL Child THQ=1 (mg/kg)	Inhalation SL Child THQ=1 (mg/kg)	Noncarcinogenic SL Child THI=1 (mg/kg)	Ingestion SL Adult THQ=1 (mg/kg)	Dermal SL Adult THQ=1 (mg/kg)	Inhalation SL Adult THQ=1 (mg/kg)	Noncarcinogenic SL Adult THI=1 (mg/kg)	Screening Level (mg/kg)
3.31E+04	-	3.01E+03	2.76E+03	4.69E+02	-	1.16E+02	9.33E+01	5.01E+03	-	1.16E+02	1.14E+02	9.33E+01 nc

Table G.3-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o(mg/kg-day)$^{-1}$	SF_oRef	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	K_p (cm/hr)	MW	B (unitless)	t^*(hr)	τ_{event}(hr/event)	FA (unitless)	In EPD?	$DA_{event\ (ca)}$	$DA_{event\ (nc\ child)}$	$DA_{event\ (nc\ adult)}$	MCL (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	No	Yes	Organics	-		-		2.00E-03	I	-		1.00E+00	1.10E-02	9.69E+01	4.17E-02	8.81E-01	3.67E-01	1.00E+00	Yes	-	4.92E-03	8.49E-03	7.00E+01
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	2.60E-07	I	6.00E-03	I	4.00E-02	I	1.00E+00	3.34E-02	1.66E+02	1.65E-01	2.14E+00	8.92E-01	1.00E+00	Yes	4.66E-01	1.47E-02	2.55E-02	5.00E+00
Trichloroethylene	79-01-6	Yes	Yes	Organics	4.60E-02	I	4.10E-06	I	5.00E-04	I	2.00E-03	I	1.00E+00	1.16E-02	1.31E+02	5.11E-02	1.37E+00	5.72E-01	1.00E+00	Yes	1.48E-02	1.23E-03	2.12E-03	5.00E+00
Vinyl Chloride	75-01-4	Yes	Yes	Organics	7.20E-01	I	4.40E-06	I	3.00E-03	I	8.00E-02	A	1.00E+00	8.38E-03	6.25E+01	2.55E-02	5.65E-01	2.35E-01	1.00E+00	Yes	2.64E-04	7.37E-03	1.27E-02	2.00E+00

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Table G.3-4
RSL Calculator - Resident Adult - Tap Water (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Default

Resident Risk-Based Regional Screening Levels (RSL) for Tap Water

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = DWSHA; W = TEF applied; E = RPF applied; G = see user's guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Ingestion SL TR=0.0001 (ug/L)	Dermal SL TR=0.0001 (ug/L)	Inhalation SL TR=0.0001 (ug/L)	Carcinogenic SL TR=0.0001 (ug/L)	Ingestion SL Child THQ=1 (ug/L)	Dermal SL Child THQ=1 (ug/L)	Inhalation SL Child THQ=1 (ug/L)	Noncarcinogenic SL Child THI=1 (ug/L)	Ingestion SL Adult THQ=1 (ug/L)	Dermal SL Adult THQ=1 (ug/L)	Inhalation SL Adult THQ=1 (ug/L)	Noncarcinogenic SL Adult THI=1 (ug/L)	Screening Level (ug/L)
Dichloroethylene, cis-1,2-	156-59-2	-	-	-	-	4.01E+01	3.63E+02	-	3.61E+01	6.67E+01	5.47E+02	-	5.95E+01	3.61E+01 nc
Tetrachloroethylene	127-18-4	3.71E+03	6.53E+03	2.16E+03	1.13E+03	1.20E+02	2.30E+02	8.34E+01	4.06E+01	2.00E+02	3.47E+02	8.34E+01	5.03E+01	4.06E+01 nc
Trichloroethylene	79-01-6	1.18E+02	7.45E+02	9.57E+01	4.94E+01	1.00E+01	6.89E+01	4.17E+00	2.83E+00	1.67E+01	1.04E+02	4.17E+00	3.23E+00	2.83E+00 nc
Vinyl Chloride	75-01-4	2.14E+00	2.77E+01	3.35E+01	1.88E+00	6.02E+01	8.93E+02	1.67E+02	4.21E+01	1.00E+02	1.29E+03	1.67E+02	5.97E+01	1.88E+00 ca

Table G.3-5a

Dermal Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-4 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	**Fraction absorbed water** [(1)] (unitless)	**Permeability Constant** [(2)] (cm/hr)	**Lag Time per Event** [(3)] (hr/event)	**Time to reach steady state** [(3)] (hr)	**Event Duration** [(4)] (hr/event)	**Molecular Weight** [(2)] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis** [(5)] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	4.0	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	4.0	131.39	0.051

Notes:

(1) Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

(2) Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

(3) Previously calculated on Table G.3-12.

(4) Value obtained from Table 14.

(5) Value estimated using Equation A-1 (USEPA, July 2004).

Table G.3-5b
Exposure Factors for Groundwater — Construction Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (SubCh) mg/kg-day	RfCi (SubCh) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	8.00E-03	4.10E-02	1	1.00E-04	1	1	1000	1000	0.02	3527	250	1	80	25,550	365
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.20E-03	1	1.00E-04	1	1	1000	1000	0.02	3527	250	1	80	25,550	365

Notes:
ND = No data available

Table G.3--5c
Calculation of Groundwater SSSLs — Construction Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

	POTENTIAL GROUNDWATER SSSLs - CANCER								POTENTIAL GROUNDWATER SSSLs - NONCANCER							
COPC	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)	Ingestion[1] (ug/L)	Dermal (ug/L)					Inhalation[3] (ug/L)	Combined SSSL[4] (ug/L)
	Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL			Oral	Daevent[1]	t-event vs. t*	If Eq 1	If Eq 2[2]	Dermal SSSL		
Tetrachloroethene	1.95E+07	1.10E+02	Eq 2		5.97E+05	5.97E+05	3.65E+04	3.43E+04	4.67E+04	2.65E-01	Eq 2		1.43E+03	1.43E+03	5.55E+01	5.34E+01
Trichloroethene	8.89E+05	5.04E+00	Eq 2		8.64E+04	8.64E+04	2.06E+03	2.01E+03	2.92E+03	1.66E-02	Eq 2		2.84E+02	2.84E+02	2.67E+00	2.64E+00

Notes:

[1] Calculated using values from Table G.3-5b.

[2] Calculated using values from Table G.3-5a.

[3] Calculated in Table G.3-7b.

[4] Calculated based on ingestion, dermal, and inhalation SSSLs.

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC = Not calculated -- no toxicity values available

Table G.3-6
Calculation of Acceptable Concentrations in Trench Air — Construction Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	IUR $(ug/m^3)^{-1}$	RfC_i (SubCh) mg/m^3	TR	HQ	ET (hrs/day)	EF (days/yr)	ED (yrs)	CF (ug/mg)	AT-C (hrs)	AT-N (hrs)	Acceptable Concentration in Trench Air: Cancer Inhalation (ug/m^3)	Acceptable Concentration in Trench Air: Noncancer Inhalation (ug/m^3)
Tetrachloroethene	2.60E-07	4.10E-02	1.00E-04	1	4	250	1	1000	613,200	8760	2.36E+05	3.59E+02
Trichloroethene	4.10E-06	2.20E-03	1.00E-04	1	4	250	1	1000	613,200	8760	1.50E+04	1.93E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater vapors in a trench for the construction worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC = Not calculated -- no inhalation toxicity values available

Table G.3-7a
Input Values for Trench Model (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench Dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	**8**	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kl,O2	0.002	cm/s	CF3	3600	s/hr	Width	**3**	ft
MWO2	32		F	**1**			0.91	m
T	**77**	F	ACH	2	hr-1	Depth	**8**	ft
T	298	K					2.44	m
R	8.20E-05	atm-m^3/mol-K				Ratio: width/depth	0.38	

Notes:
The equations in which these values are used are from the following source:
Virginia Department of Environmental Quality (VDEQ), 2022, Virginia Unified Risk Assessment Model – VURAM User Guide for Risk Assessors.

Table G.3-7b
Calculation of Groundwater SSSLs for Vapors in a Trench -- Construction Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

Cancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	2.36E+05	3.65E+04
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.50E+04	2.06E+03

Noncancer

COPC	Molecular Weight [1] MW_i (g/mol)	Henry's Law Constant [1] H_i (atm-m^3/mol)	Gas-Phase Mass Transfer Coefficient [2] Ki_G (cm/s)	Liquid-Phase Mass Transfer Coefficient [2] Ki_L (cm/s)	Overall Mass Transfer Coefficient [2] K_i (cm/s)	Volatilization Factor [2] VF (L/m^3)	Acceptable Concentration in Trench Air[3] C_{trench} (ug/m^3)	SSSL: Concentration in Groundwater[4] C_{gw} (ug/L)
VOCs								
Tetrachloroethene	165.83	1.77E-02	3.96E-01	8.79E-04	8.76E-04	6.47E+00	3.59E+02	5.55E+01
Trichloroethylene	131.39	9.85E-03	4.28E-01	9.87E-04	9.81E-04	7.24E+00	1.93E+01	2.67E+00

Notes:

[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[2] Values calculated using inputs from Table G.3-7a and equations contained within the Trench Model (VDEQ, 2022).

[3] Values calculated in Table G.3-6.

[4] Groundwater SSSL for trench vapor pathway = acceptable concentration in trench air / volatilization factor

NC = Not calculated -- no inhalation toxicity values available

Table G.3-8a

Dermal Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-4 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water[1] (unitless)	Permeability Constant[2] (cm/hr)	Lag Time per Event[3] (hr/event)	Time to reach steady state[3] (hr)	Event Duration[4] (hr/event)	Molecular Weight[2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis[5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.71	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.71	131.39	0.051

Notes:

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.3-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.3-8b
Exposure Factors for Groundwater — Industrial Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-C (days)	AT-N (days)
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1	1.00E-04	1	1	1000	1000	1	950	250	25	80	25550	9125
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1	1.00E-04	1	1	1000	1000	1	950	250	25	80	25550	9125

Notes:

ND = No data available

Table G.3-8c
Calculation of Groundwater SSSLs — Industrial Worker (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

	GROUNDWATER - CANCER									GROUNDWATER - NONCANCER						
COPC	**Cancer Oral (ug/L)**		**Cancer Dermal (ug/L)**					**Ing + Dermal (ug/L)**		**Noncancer Oral (ug/L)**	**Noncancer Dermal (ug/L)**					**Ing + Dermal (ug/L)**
	Oral		**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**			**Oral**	**DAevent**	**t-event vs. t***	**If Eq 1**	**If Eq 2**	**Dermal Total**	
Tetrachloroethene	1.56E+04		1.64E+01	Eq 1	2.21E+05		2.21E+05	1.45E+04		7.01E+02	7.38E-01	Eq 1	9.96E+03		9.96E+03	6.55E+02
Trichloroethene	7.11E+02		7.48E-01	Eq 1	3.63E+04		3.63E+04	6.97E+02		5.84E+01	6.15E-02	Eq 1	2.99E+03		2.99E+03	5.73E+01

Notes:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the industrial worker scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NC - Not Calculated (No Toxicity Values are available)

Table G.3-9
Calculation of Soil SSSLs — Child (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo mg/kg-day	RfCi mg/m^3	GIABS	TR	HQ	CF-Air (ug/mg)	CF-Soil (kg/mg)	IR-S (mg/day)	FI	EF (days/yr)	ED (yrs)	BW (kg)	VF (m3/kg)	ET (hrs/day)	AT-C (Hrs)	AT-N (Hrs)	AT-C (days)	AT-N (days)
Tetrachloroethene	NA	NA	6.00E-03	4.00E-02	1	NA	1	1000	1.00E-06	200	1	350	6	15	2790	24	NA	52560	NA	2190

	SOIL - CANCER				SOIL - NONCANCER			
COPC	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING + DER + Inh (mg/kg)	Ingestion (mg/kg)	Dermal (mg/kg)	Inhalation (mg/kg)	ING+DER +Inh (mg/kg)
Tetrachloroethene	NA	NA	NA	NA	4.6929E+02	-	116	93

Note:

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to soil for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

NA - Not Applicable

Table G.3-10a

Dermal Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-4 and HQ of 1)

Alabama Army National Guard OMS #28

Mobile, Alabama

Parameter	Fraction absorbed water[1] (unitless)	Permeability Constant[2] (cm/hr)	Lag Time per Event[3] (hr/event)	Time to reach steady state[3] (hr)	Event Duration[4] (hr/event)	Molecular Weight[2] (g/mole)	Kp Stratum Corneum: Kp Viable Epidermis[5] (unitless)
Chemical	FA	Kp	τ_{event}	t*	t_{event}	MW	B
cis-1,2-Dichloroethene	1.0	0.011	0.37	0.89	0.54	96.944	0.042
Tetrachloroethene	1.0	0.0334	0.91	2.18	0.54	165.83	0.165
Trichloroethene	1.0	0.0116	0.58	1.39	0.54	131.39	0.051

Notes

[1] Value obtained from Appendix B, Exhibit B-3 (USEPA, July 2004).

[2] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

[3] Previously calculated on Table G.3-12.

[4] Value obtained from Table 14.

[5] Value estimated using Equation A-1 (USEPA, July 2004).

Table G.3-10b
Exposure Factors for Groundwater — Resident Child (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

COPC	SFo $(mg/kg\text{-}day)^{-1}$	IUR $(ug/m^3)^{-1}$	RfDo (Chronic) mg/kg-day	RfCi (Chronic) mg/m^3	GIABS	TR	HQ	EV (Events/day)	CF (ug/mg)	CF (cm3/L)	IR-W (L/day)	SA (cm2)	EF (days/yr)	ED (yrs)	BW (kg)	AT-N (days)
cis-1,2-Dichloroethene	ND	ND	2.00E-03	ND	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Tetrachloroethene	2.10E-03	2.60E-07	6.00E-03	4.00E-02	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03
Trichloroethene	4.60E-02	4.10E-06	5.00E-04	2.00E-03	1.00E+00	NA	1.00E+00	1.00E+00	1.00E+03	1.00E+03	7.80E-01	6.37E+03	3.50E+02	6.00E+00	1.50E+01	2.19E+03

Notes:

NA - Not Applicable

ND = No data available

Table G.3-10c
Calculation of Groundwater SSSLs — Resident Child (SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

NONCANCER - GROUNDWATER

COPC	Noncancer Oral (ug/L)	Noncancer Dermal (ug/L)					SSSL: Ing + Dermal (ug/L)
	Oral	DAevent	t-event vs. t*	If Eq 1	If Eq 2	Dermal Total	
cis-1,2-Dichloroethene	4.01E+01	4.92E-03	Eq 1	3.61E+02		3.61E+02	3.61E+01
Tetrachloroethene	1.20E+02	1.47E-02	Eq 1	2.28E+02		2.28E+02	7.88E+01
Trichloroethene	1.00E+01	1.23E-03	Eq 1	6.84E+01		6.84E+01	8.75E+00

Notes

USEPA's Regional Screening Level (RSL) Calculator does not calculate an RSL (or Site-Specific Screening Level (SSSL)) for exposure to groundwater for the residential child scenario; therefore, the SSSL was calculated using USEPA's standard risk equations.

Table G.3-11
Estimation of DA_{event} - Lag Time per Event (t_{event}) for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

$$\tau_{event} = \frac{l_{sc}^{2}}{6 * D_{sc}} = 0.105 * 10^{(0.0056*MW)}$$

Used in calculation for τ_{event} (Equation A.4 in USEPA 2004)	Molecular Weight [1] (g/mole)	EDC for stratum corneum/ Apparent thickness of stratum corneum (cm/hr)	EDC for stratum corneum/ Apparent thickness of stratum corneum (cm/hr)	Apparent thickness of stratum corneum (cm)	Effective Diffusion Coefficient through Stratum Corneum (cm2/hr)	Lag Time per Event (hr/event)
Chemical	MW	Log *Dsc/lsc*	*Dsc / lsc*	*lsc*	*Dsc*	τ_{event}
cis-1,2-Dichloroethene	96.944	-3.349093339	0.000447617	0.001	4.48E-07	0.37
Tetrachloroethene	165.83	-3.735667794	0.000183794	0.001	1.84E-07	0.91
Trichloroethene	131.39	-3.542397402	0.000286815	0.001	2.87E-07	0.58

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).

Table G.3-12
Estimation of DA_{event} - Time to Reach Steady State for Dermal Contact with Groundwater
(SSSLs Based on Risk of 10-4 and HQ of 1)
Alabama Army National Guard OMS #28
Mobile, Alabama

If $B \leq 0.6$, then $t^* = 2.4 * \tau_{event}$

If $B > 0.6$, then $t^* = 6 * \tau_{event} (b - \sqrt{b^2 - c^2})$

$b = \frac{2 * (1 + B)^2}{\pi} - c \qquad c = \frac{1 + 3B + 3B^2}{3 * (1 + B)}$

Used in calculation for t* (Equation A.5 or A.6 in USEPA 2004). Also uses Equations A.7 and A.8 for b and c in USEPA 2004.	**Permeability Constant** [1] (cm/hr)	**Molecular Weight** [1] (g/mole)	**Kp Stratum Corneum: Kp Viable Epidermis** (unitless)	**Lag Time per Event** (hr/event)	**Formula Used**	**Time to reach steady state** (hr)	**Correlation Coefficients** (unitless)	**Correlation Coefficients** (unitless)
Chemical	Kp	MW	B	τ_{event}	Formula	t*	b	c
cis-1,2-Dichloroethene	0.011	96.944	0.042	0.37	Eq. A.5	0.89	0.33	0.36
Tetrachloroethene	0.0334	165.83	0.165	0.91	Eq. A.5	2.18	0.41	0.45
Trichloroethene	0.0116	131.39	0.051	0.58	Eq. A.5	1.39	0.34	0.37

Note:
[1] Value obtained from the RSL Chemical-Specific Parameters Supporting Table (USEPA, November 2021).