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Baseline Human Health Risk Assessment For the Westinghouse Hematite Site

Rev 1

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Acronyms, Abbreviations, and Units of Measure[1]

ABB	Asea Brown Boveri
ASTM	American Society for Testing and Materials
ATSDR	Agency for Toxic Substance and Disease Registry
bls	Below land surface
CDI	Chronic daily intakes
CE	Combustion Engineering, Inc.
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act
COPCs	Constituents of potential concern
CSM	Conceptual site model
CTE	Central tendency exposure
DAD	Dermal absorbed dose
DTL	Default target level
EPC	Exposure point concentration
FGR 13	Federal Guidance Report 13
HEAST	Health Effects Assessment Summary Tables
HI	Hazard Index
HQ	Hazard Quotient
HHRA	Human Health Risk Assessment
IAEA	International Atomic Energy Agency
IEM	Integrated Environmental Management, Inc.
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	Increased lifetime cancer risk
IRIS	Integrated Risk Information System
LBG	Leggette, Brashears and Graham, Inc.
LOAEL	Lowest observed adverse effect level
MCL	Maximum concentration level
MDNR	Missouri Department of Natural Resources
MPC	Maximum permissible concentration
MRBCA	Missouri Risk-Based Corrective Action
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAEL	No observed adverse effect level

[1] Throughout the text of this risk assessment, various equations are presented to illustrate the calculations of exposures and risks. The variables used in these equations are described in the text of the document and are not included in this list of acronyms.

OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethylene
Ppb	Parts per billion
ppm	Parts per million
PRG	Preliminary Remediation Goal
PPRTV	Provisional Peer Reviewed Toxicity Value
QA/QC	Quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RESRAD	RESidual RADiation, a computer modeling code
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable maximum exposure
SAIC	Science Applications International Corporation
SF	Slope factor
SVOC	Semivolatile organic compounds
TCE	Trichloroethylene
TEDE	Total Effective Dose Equivalent
TPH	Total petroleum hydrocarbon
TV	Toxicity value
UCL	Upper confidence level
UF_6	Uranium hexafluoride
UNC	United Nuclear Corporation
USNRC	U. S. Nuclear Regulatory Commission
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
WEC	Westinghouse Electric Company, LLC

1.0 Introduction

This baseline Human Health Risk Assessment (HHRA) evaluates the potential risks to human health for defined populations that may now, or at some time in the future, be exposed to various constituents that were identified in the areas surrounding the Westinghouse Electric Company, LLC (WEC), former fuel cycle facility located near Hematite, Missouri. The HHRA, which considers potential exposures for a reasonably maximally exposed individual under each of several scenarios, concludes that a human health risk from these constituents may if no action were taken. It is important to note that there are several uncertainties identified within the assessment that have a significant impact on the outcome of the calculations and should therefore be considered in determining the need for and type of remedial actions to be undertaken.

The property's future land use has not been determined. Although several potential receptors have been evaluated (e.g. residential, commercial/industrial, agricultural worker, etc.) these are hypothetical scenarios that do not take into account engineering or institutional controls that are currently in place.

Data for this baseline HHRA were provided from the Remedial Investigation (RI) completed in 2004 (Science Applications International Corporation [SAIC], 2007). SAIC also performed the data quality assurance and quality control (QA/QC) and data validation.

Two types of risk are evaluated in this assessment. The first is a total cancer risk from constituents considered. The acceptable level of risk based on U. S. Environmental Protection Agency (USEPA) guidelines is an excess risk of cancer that is not more than one in ten thousand (10^{-4}) to one in one million (10^{-6}) greater than the excess risk of the general population. Cancer risks associated with non-radiological constituents are discussed in Section 6.1. Cancer risks associated with radiological contaminants are discussed in Section 6.3.

Additionally, for radionuclide exposure, a dose assessment that estimates the total radiological exposure is presented in Section 6.3. Regulatory guidance addressing radionuclide contamination is expressed in terms of annual radiation dose, millirem per year (mrem/year).

The second type of risk is a non-cancer health hazard from exposure to non-carcinogenic constituents through various pathways. This type of risk is measured through the use of a hazard quotient (HQ) that is derived primarily through the use of exposure assumptions and reference doses (RfDs) provided in USEPA guidance documents. An HQ is the ratio of a single substance exposure level over a specified time period (e.g., subchronic) to a reference dose (or

concentration) for that substance derived from a similar exposure period. Non-cancer risks are discussed in Section 6.1. Non-cancer risks specific to lead exposures are discussed in Section 6.2. In using the guidance provided by the USEPA, as well as input from other regulatory agencies such as the Missouri Department of Natural Resources (MDNR), the risk values calculated in this report represent a conservative estimate of risk for a reasonably maximally exposed individual. A list of these guidance documents is provided in Section 1.3.

Data were not obtained directly from the burial pits for various reasons including regulatory approvals, safety concerns, heterogeneity of materials, etc. Because of the lack of representative data, the risk associated with the burial pits has been evaluated qualitatively rather than quantitatively. Based upon a review of materials deposited into the burial pits, they are considered to pose an unacceptable risk to human health if left unaddressed.

In this report the terms facility, site and property are defined in the following way:

- Hematite Facility -- the central portion of the property, approximately 18 acres encompassing the historic primary operations area, Site Pond and burial pits areas;
- Hematite Site -- the Hematite Facility and other areas that were the focus of the investigation; and
- Westinghouse Property -- the 228 acres owned by WEC.

Uncertainty is an inherent quality to any risk assessment. The number and significance of the uncertainties associated with this risk assessment demand that a broad spectrum of exposure scenarios be included. Incorporating a number of scenarios representing various populations created a range of risk estimates for consideration in determining the need for and type of remedial action. Given the uncertainties, and the conservatism built into this assessment, the actual risk for average individuals is likely to be much lower than that calculated in this assessment. These uncertainties are discussed in Section 6.5.

1.1 Report Organization

Section 1.0 provides an introduction to this report. Section 2.0 identifies the exposure pathways and potentially exposed populations that are addressed in the HHRA. Section 3.0 addresses the constituents of potential concern (COPCs). The exposure assessment is presented in Section 4.0, including the quantification of exposure concentrations for the COPCs in the applicable media and the presentation of exposure factors for applicable receptors. In Section 5.0, the toxicity of the COPCs is addressed, and the cancer slope factors and non-carcinogenic RfDs that are used in the risk assessment are presented. The risk characterization is presented in Section 6.0. This

characterization includes the presentation of media-specific non-carcinogenic health hazards and carcinogenic risks, an assessment of radiological risk and annual radiation dose, and an evaluation across various media and pathways. Section 7.0 lists the references that are cited in the body of the report.

1.2 Site Background

The baseline HHRA was performed for the former nuclear fuel cycle facility that is located at 3300 Missouri State Road P in Jefferson County near the unincorporated village of Hematite, Missouri. The Westinghouse Property is situated on 228 acres with primary operations historically being conducted within the Facility area (Figure 1). No known activities related to nuclear fuel manufacturing occurred in the outlying acreageof the Property. The relationship between the Site and potential exposure units evaluated in the HHRA is discussed in Section 4.0. The term "Site" is defined in this risk assessment as the Hematite Facility and other areas that were the focus of the investigation. This risk assessment evaluates the entire Site as one exposure unit. The Site includes the Westinghouse Hematite Property and Facility as well as portions of land to the east of the Hematite Property where investigation was conducted.

Nuclear-related operations at the Hematite Facility began with the purchase of the Property (then consisting of farmlands) by Mallinckrodt Chemical Works in 1955. The Hematite Facility became operational in July 1956, producing uranium metals for the nuclear fuel program of the U.S. Navy. Mallinckrodt Chemical Works and related entities operated the Hematite Facility until 1961, when ownership was transferred to a joint venture called United Nuclear Corporation (UNC). UNC continued to produce uranium products for the federal government. In 1971, UNC and Gulf Oil Corporation (Gulf) entered into a joint venture, forming the Gulf United Nuclear Fuels Corporation, (GUNFC) which owned and managed the Hematite Facility until late 1973, when Gulf acquired UNCs interest in GUNFC. General Atomic Company (GAC), a partnership involving Gulf, owned the Hematite Facility from January 1974 through May 1974 when Combustion Engineering Inc. (CE) purchased the Hematite Facility from GAC. Asea Brown Boveri (ABB) purchased the stock of CE in 1989, and CE began operating the Hematite Facility as ABB Combustion Engineering. In April 2000, WEC purchased the nuclear operations of ABB, which included the Facility at Hematite. WEC ceased operations in June 2001 and is proceeding with site decommissioning and remediation.
Throughout its history, the manufacture of uranium metal and compounds from natural and enriched uranium was the primary activity at the Hematite Facility (Leggette, Brashears and Graham, Inc. [LBG], 2003). Operations included the conversion of uranium hexafluoride (UF_6) gas of various uranium 235 enrichments to uranium oxide, uranium carbide, uranium dioxide

pellets, and uranium metal. During the period prior to CE's purchase of the Property in 1974, government projects dominated Hematite facility operations. Many of these operations were classified, and details regarding the exact nature of production processes prior to 1974 are not known. The following are examples of known projects during this time (LBG, 2003):

- production of uranium metal for use in the U. S. Navy's nuclear-powered submarines and destroyers;
- production of specialized uranium oxides for use in the U. S. Army's Army Package Power Reactor;
- production of highly enriched uranium oxides for a General Atomics gas-cooled reactor;
- production of highly enriched uranium metal for materials test reactors utilized by the U. S. Navy;
- production of uranium-beryllium pellets for use in the SL-1, an experimental U. S. military nuclear power reactor that was part of the Army Nuclear Power Program;
- production of high-enrichment uranium zirconia pellets for a naval reactor; and
- production of highly enriched oxides for use in General Atomics nuclear rocket projects.

Although uranium material production was the primary function at the Hematite Facility, records indicate secondary activities such as uranium scrap recovery and a limited amount of work with thorium compounds as part of early research into the use of thorium in the fuel cycle. A detailed list of radioactive feed materials historically used for production is not available. However, previous investigators have compiled a list of chemicals (Table 1.1) used at the Hematite Facility during active operations (LBG 2003).

1.3 Guidance Documents

Procedures and methodologies used in the risk assessment were based on the following guidance, including:

- *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual-Part A* (USEPA 1989a)[2]

- *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Goals)* (USEPA 1991a)

- *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)* (USEPA 1998)

- *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment*) (USEPA 2004)

- *Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03*, March 1991 (USEPA 1991b)

- *Exposure Factors Handbook*, Office of Research and Development, Washington, D.C. (USEPA 1997a)

- *Health Effects Assessment Summary Tables (HEAST)*, Annual FY 1997 (USEPA 1997b)

- *Risk Characterization Handbook* (USEPA 2000a)

- *Supplemental Guidance to RAGS: Calculating the Concentration Term* (USEPA 1992a)

- *Risk Assessment Guidance for Superfund*, Volume I, Human Health Evaluation Manual, Supplemental Guidance, "Standard Default Exposure Factors", Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-0 (USEPA, 1991c)

- *Evaluating and Identifying Contaminants of Concern for Human Health*, Region VIII Superfund Technical Guidance RA-03, September 1994 (USEPA, 1994)

- *Land Use in the CERCLA Remedy Selection Process*, OSWER Directive 9355.7-04, (USEPA, May 25, 1995).

[2] The protocol for the assessment of risk associated with ionizing radiation is described by the USEPA in RAGS Part A in Chapter 10 and RAGS Part B in Chapter 4.

2.0 Conceptual Site Model

Risk assessments must first identify what populations might be affected by potential risks in a specific area, both now and in the future. Exposures can only occur when a receptor can directly contact released constituents or when there is a mechanism for the released constituents to be transported to a receptor. Without exposure, there is no risk; therefore the exposure assessment is one of the key elements of a risk assessment. In the case of groundwater, exposure to constituents may occur through ingesting the water when using groundwater as a drinking water source, through inhalation of volatile organic compounds (VOCs) when using groundwater to shower, and through dermal contact when using groundwater to bathe. For soil, exposure to constituents may occur through direct contact, through inhalation of airborne soil particulates, through incidental ingestion of soil during daily activities, and (for radionuclides) through external radiation. Exposure to constituents in surface water/sediment may occur through dermal contact, incidental ingestion, and inhalation during various activities in and around surface waters.

A Conceptual Site Model (CSM) has been developed that identifies the exposure medium, exposure points, receptor population and age, and exposure route. The CSM identifies pathways as complete or incomplete, and provides a justification for the designation. The CSM is presented as Table 1.1 (current exposure) and Table 1.2 (potential future exposure).

The Site has been in industrial use for nearly 50 years, and current Site users are industrial workers. The baseline HHRA evaluates risk to such workers, as well as construction workers and trespassers who might come in contact with COPCs at the Site. The residents situated on the facility Property are located outside the Facility and are not potentially exposed to COPCs present at the Site.

WEC is planning to decommission the former fuel cycle facility, dismantle facility structures, and terminate its NRC license. As part of decommissioning planning, WEC is evaluating final end uses of the Site, including unrestricted use. In accordance with USEPA guidance (USEPA, May 25, 1995), the baseline HHRA generally needs only to consider the reasonably anticipated future land use. As stated in the preamble to National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (55 Federal Register 8710), however, more than one future land use assumption may be considered in the baseline HHRA when there is uncertainty regarding the anticipated future land use. In such cases, it can be useful to compare the potential risks associated with several land use scenarios to estimate the impact on human health of decisions regarding land use and how institutional controls should be used to restrict future uses. Consistent with this USEPA guidance, this baseline HHRA examines risks to a wide spectrum of

potential future Site users, including residential, commercial/industrial, recreational, visitor/trespasser, and agricultural.

2.1 Exposure Pathways

During development of the CSM, the following factors were considered:

Medium	Groundwater Surface water/Sediment Surface soil Subsurface soil
Exposure Medium	Groundwater Indoor Air Outdoor Air Surface Water/Sediment Surface Soil (particulates and vapor) Subsurface Soil (particulates and vapor)
Exposure Route	Dermal Ingestion Inhalation
Receptor Population (including current and possible future)	Resident Commercial/Industrial Worker (non-residential) Construction Worker Recreational User Visitor/Trespasser Agricultural Worker (farmer)
Receptor Age	Child Adult Composite Adult[3]

Table 1.3 lists the completed exposure pathways as well as a description of the particular data grouping used to prepare the exposure point concentration for each pathway. Table 1.4 lists the specific data points used to prepare the exposure point concentrations. Figures 2 through 5 displays the location of the sampling points according to media.

[3] The composite adult is assumed to be a 30-year individual: 6 years as a child and 24 years as adult.

The data were grouped as described below:

- For those exposure scenarios associated with dermal contact, ingestion, or inhalation of groundwater coming into a building through a shower head or tap, the groundwater data was used to calculate the exposure point concentration (EPC). To calculate the discrete risks associated with different hydrogeologic units, the data were grouped according to where the well was screened. Wells screened in the overburden were considered one group, and wells screened in the bedrock were considered a second group.

- For those exposure scenarios associated with inhalation from groundwater, both indoor and outdoor, groundwater data collected from wells screened in the overburden were used to calculate the EPC. Furthermore it is assumed that outdoor exposures of residents or commercial/industrial workers strolling through the floodplain will be similar to that of a visitor or recreational user and are therefore not considered. Data from bedrock wells were not used because the constituents are too deep to create a substantive inhalation risk at the ground surface.

- For those exposure scenarios associated with outdoor inhalation of vapors from groundwater, including construction worker, recreational use, visitor/trespasser, and agricultural user, groundwater data collected from wells screened in the overburden were used to calculate the EPC. Data from bedrock wells were not used because the constituents are considered to be too deep to create a substantive inhalation risk at the ground surface.

- For those exposure scenarios associated with ingestion or dermal contact with surface water or inhalation of vapors from surface water, samples from surface water bodies were used to calculate the EPC.

- For those exposure scenarios associated with residents or commercial/industrial workers contacting surface soil, soil samples from surface soils were used to calculate the EPC. Furthermore it is assumed that outdoor exposures of residents or commercial/industrial workers strolling through the floodplain will be similar to that of a visitor or recreational user, and was therefore not considered.

- For those exposure scenarios associated with construction worker, recreational user, visitor/trespasser, and agricultural worker coming in contact with surface soil, all surface soil samples, including those in the flood plain, were used to calculate the EPC.

- For those exposure scenarios associated with indoor inhalation of vapors from subsurface soils by residents and commercial/industrial workers, subsurface soil samples were used to calculate the EPC. Furthermore, it is assumed that outdoor exposures of residents or commercial/industrial workers strolling through the floodplain will be similar to that of a visitor or recreational user, and was therefore not considered.

- For those exposure scenarios associated with a construction worker coming in contact with subsurface soils, subsurface soil samples to the assumed depth of construction were used to calculate the EPC. The assumed depth of construction is 15 feet.

- For those exposure scenarios associated with a construction worker, agricultural worker, recreational user, or visitor/trespasser coming in contact with outdoor air constituents from subsurface soils, all subsurface soil samples were used to calculate the EPC.

According to the RI, the surface water samples were not filtered prior to analysis, such that the COPC concentrations reported for these samples represent the potential exposure by the swimmer to both surface water and suspended sediment. Data sets using surface water are denoted as "surface water/sediment". The data from the RI was used to establish the EPC for each exposure scenario. The use of these selected data sets is discussed further in Section 4.2.

Special attention was paid to surface water and sediment samples collected from Joachim Creek since it is an area of frequent current recreational use by nearby residents. There were no instances of COPCs above PRGs in the surface water or sediment of Joachim Creek.

2.2 Exposure Scenarios Considered

The exposure scenarios considered below were divided by receptor and age when applicable. Exposure factors for the receptors considered are presented in Table 4.1. The following paragraphs briefly summarize general assumptions made about each receptor.

Resident Child

The resident child is defined as a potential future receptor with an exposure duration of 6 years, from birth to 6 years of age. In general, the child resident has lower exposure factors than the resident adult with the exception of soil ingestion rate, time spent outdoors, and soil-to-skin adherence factor. The residential water supply is assumed to be from groundwater wells. It is assumed that the resident child bathes, instead of showers, daily for approximately 45 minutes. Dermal exposure to groundwater for the child assumes a bathing scenario in which the entire body is in contact with the water. The resident child is dermally exposed to surface soil

outdoors, groundwater from the tap, groundwater during bathing, and surface water during swimming. Dermal exposure to subsurface soil is not expected, and therefore is not considered. The child incidentally ingests surface soil from the outdoors, ingests groundwater from the tap, and incidentally ingests surface water during swimming. The child breathes outdoor vapors and particulates and indoor vapors from various sources.

Resident Adult

The resident adult is as a potential future receptor with an exposure duration of 24 years, from ages 6 to 30 years of age. In general the adult has higher exposure factors than the resident child with the exception of those previously mentioned in the Resident Child. Again, the residential water supply is assumed to be from groundwater wells. It is assumed that the resident adult showers, instead of bathes, daily for approximately 35 minutes per day. The resident adult is dermally exposed to surface soil outdoors, groundwater from the tap, groundwater during showering, and surface water during swimming. Dermal exposure to subsurface soil is not expected, and therefore is not considered. The adult incidentally ingests surface soil from the outdoors, ingests groundwater from the tap, and incidentally ingests surface water during swimming. The adult inhales outdoor vapors and particulates and indoor vapors from various sources.

Composite Resident Adult

The composite adult is defined as a potential future receptor who is a resident child for 6 years and a resident adult for 24 years. The risk to the composite adult is the addition of risk associated with the resident child and resident adult. The result is a 30-year based risk for a resident from birth to 30 years of age.

Commercial/Industrial Worker

The commercial/industrial worker is defined as an adult receptor (without personal protective equipment) with an exposure duration of 25 years and who works 250 days per year. The baseline HHRA examines both a current and future commercial/industrial worker. The worker spends a majority of the workday indoors and does not perform construction-related or utility work, such as trenching or excavation.

The skin of the current commercial/industrial worker is exposed to surface soil outdoors and surface water. Dermal exposure to surface water is limited to bare hands only. The worker incidentally ingests surface soil and surface water. The worker inhales outdoor vapors and particulates and indoor vapors from various sources.

In addition to these exposure routes, the future commercial/industrial worker is exposed to COPCs through groundwater from the tap. The baseline HHRA assumes that groundwater is developed as the water supply. Accordingly, the future commercial/industrial worker is incidentally dermally exposed to groundwater from the tap and ingests groundwater from the tap.

Construction Worker

The construction worker is defined as an adult receptor with an exposure duration of one year and who works 225 days per year. The exposure to the construction worker is the same under both current and future scenarios.

The construction worker spends the entire workday outdoors. Indoor inhalation pathways are not considered under the construction worker scenario. The worker is dermally exposed to surface soil, subsurface soil to fifteen feet below ground surface and groundwater in the overburden. Dermal exposure to media is limited to the face, hands, and forearms. The worker incidentally ingests surface soil, subsurface soil, and groundwater from contact with these media. It is assumed the construction worker does not obtain drinking water from the Site, either now or in the future. The construction worker inhales outdoor vapors and particulates from various sources.

Recreational Child/Adult

The recreational child and adult are defined as potential future receptors that spend 195 days per year at the site conducting recreational activities. Physically the recreational child and adult are equivalent to their resident counterparts and incur similar outdoor exposures. Indoor pathways are not considered for the recreational receptor, however, because all activities are assumed to be conducted outdoors. Surface water exposures are considered for the recreational receptor. The recreational child and adult swim in surface waters for a duration of 3 hours, 12 days per year. The recreational child and adult do not consume drinking water from the site.

Visitor/Trespasser

The visitor/trespasser is defined as an adult receptor that visits the site 24 days per year for 24 years. The baseline HHRA considers the visitor/trespasser under both current and future scenarios. Physically, the visitor/trespasser is similar to the resident or recreational adult and is exposed to the same outdoor exposures. Indoor pathways, including ingestion or other exposures from groundwater use, are not considered for this receptor since all activities are assumed to be conducted outdoors. Surface water exposures are considered and are similar to those of the recreational or resident adult.

Agricultural

The agricultural worker is defined as a potential future adult receptor that works on the Site for 225 days per year for 30 years. Physically, the agricultural worker is most similar to the construction worker and is exposed to the same outdoor exposures. Indoor pathways, including ingestion or other exposures from groundwater use, are not considered for this receptor because all activities are assumed to be conducted outdoors. Surface water exposures are considered and are similar to those of the construction worker.

Current farming activities involve pasturing livestock, which take place on the northeast corner of the property. This area is relatively unimpacted. Furthermore, exposure factors used in the risk calculations for this receptor represent a farmer that cultivates the land, and grows crops. Pasturing livestock would result in lower exposures, therefore, the calculated risk to the current farmer is considered to be conservative.

3.0 Constituents of Potential Concern

The purpose of the identification of the COPCs for use in the risk assessment is to focus the risk assessment process on the detected constituents that pose a potential threat to human health. Section 3.1 defines the data sets that are used to represent the concentrations of constituents in the exposure media (e.g., surface soil). Section 3.2 describes the screening procedures used to select the COPCs. Section 3.3 presents the identified COPCs for each medium.

3.1 Data Sets

The data used in this risk assessment were collected in 2004 during the site characterization portion of the RI (SAIC, 2007). The data include samples from the following media: surface water/sediment, surface soil, subsurface soil, and groundwater.

In general, the data set includes quantitative results for the following analyses:

- VOCs;
- Semi-volatile organic compounds (SVOCs);
- Pesticides;
- Polychlorinated biphenyls (PCBs);
- Selected radioactive isotopes; and
- Inorganics (heavy metals, cyanide, sulfates, nitrates, etc.).

A select number of samples were also analyzed for the following:

- Dioxins; and
- Total petroleum hydrocarbons (TPH).

The complete data set used for the HHRA is included in the RI report. The sample locations are presented on Figures 1 through 5.

3.2 Data QA/QC and Validation

Data for this HHRA were provided from the RI completed in 2004 (SAIC, 2007). SAIC performed the data QA/QC and validation. Samples were analyzed for a wide range of constituents. Sampling locations were biased toward impacted areas on the site, which resulted in a good representation of the maximum concentrations. Analytical methods used by the

analytical laboratories were equivalent to those approved by USEPA. Procedures used in the field to collect the samples were based on approved field collection methodology. The number of samples collected provided adequate data for competent statistical evaluation.

It was observed that some of the detections for organics may be false positives. A common cause for false positives was a result of contamination of samples with common laboratory contaminants. Among the VOCs, methylene chloride, acetone, 2-butanone and cyclohexane are frequent lab and method blank contaminants. For the RI data set, most of these contaminants were detected in method blanks and data were appropriately qualified with validation code. The laboratory reported standard sample quantitation limits (SQLs) as described in the method requirements.

3.3 Screening Procedures

It is important to focus on constituents that have the potential to cause substantive risk. Screening procedures are used to limit the number of COPCs in each medium. Screening was performed using procedures consistent with USEPA CERLCA guidance (USEPA 1989a). Three screening procedures are used for the risk assessment data sets to assure that the appropriate constituents are being assessed. Screening procedures are described in the following paragraphs.

Table 2.1 presents a summary of the chemical COPCs selected following the screening process. The chemical COPCs were selected following the steps described below:

- Data were grouped by medium (groundwater, surface water/sediment, surface soil and subsurface soil.);[4]

- Detected compounds were extracted from the medium-specific data sets; and

- The highest detected concentrations for each detected compound were compared to the 2004 USEPA Region IX Preliminary Remediation Goals (PRGs) and identified as either being above screening level or below screening level. The 2004 USEPA Region IX PRGs were used to screen compounds because they are considered to be conservative values that are protective of human health.

[4] Data collected from the flood plain were included in the screening procedure. The screening procedure was an evaluation of the entire data set. However, COPCs were not screened further once EPC sets were developed.

- Constituents detected at maximum concentrations below the respective PRGs were not retained as COPCs. This method of determining COPCs is both protective and conservative because the sampling locations were biased to areas of suspected contamination.[5]

- Additional compounds were eliminated based on the following criteria as described in the USEPA Region VIII Superfund Technical Guidance for Evaluating and Identifying Contaminants of Concern for Human Health (USEPA, 1994), which was based on the USEPA Risk Assessment Guidance for Superfund (RAGS) Part A (USEPA 1989a):

    - Compounds identified as essential nutrients were not retained as COPCs. For the purposes of this HHRA, the following compounds were removed from the list of COPCs: iron, zinc, manganese, and chloride.

    - Those constituents having a frequency of detection of less than 5 percent were not retained as COPCs. The compounds that were screened out due to this criterion were further evaluated to ensure their removal was appropriate. A description of this evaluation follows.

Several compounds were removed from consideration through the screening process because they occurred in less than 5 percent of the total sample population. These compounds were evaluated to ensure that they were not erroneously excluded. The following compounds were detected in less than 5 percent of samples[6]:

Groundwater: 1,1,2-trichloroethane, 1,2-dichloroethane, benzene, chloroethane, chloroform, phenol, and thallium. The majority of these compounds were detected at concentrations only slightly above detection limits, and most of the

[5] The values for trichloroethylene (TCE) and tetrachloroethylene (PCE) in tap water as presented in the 2004 USEPA Region IX PRGs are based on draft toxicological values. These PRGs are well below maximum contaminant levels (MCLs) for drinking water and are below typical method detection limits for these compounds. TCE and PCE were not screened out of surface water and groundwater data sets and were retained in the risk assessment to maintain data quality objectives.

[6] Benzo(a)anthracene and benzo(b)fluoranthene were detected in 5.5 percent and 5.8 percent of samples respectively, while benzo(a)pyrene was detected in 4.3 percent of samples. These compounds generally occur together and were treated as a group even though two of the compounds were detected with frequencies slightly above 5 percent.

detections were qualified by the laboratory as estimated values because the concentrations were so low.[7]

Surface Soil: Dibenzo(a,h)anthracene. This compound was detected in three samples. Two of the three samples were qualified by the laboratory as estimated values because the concentrations were so low.

Subsurface Soil: Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene. The majority of detections were qualified by the laboratory as estimates values because the concentrations were so low.[8]

The compounds identified above were excluded from the risk assessment because they occurred in less than, or nearly less than, 5 percent of the samples that were analyzed for those compounds. Based on a review of the data and sample locations, it is believed that excluding these compounds is justified for the following reasons:

- Most of the detections are only slightly above the detection limit, and most are qualified as estimated values by the laboratory.
- Because these compounds are found at such low concentrations and with low frequency, it is unlikely that they would be drivers for remediation.

Table 2.1 summarizes the COPCs selected following the two screening process described above. Tables 2.2 through 2.19 provide a comparison of highest concentrations to USEPA Region IX PRGs. Each table presents a summary of the occurrence, distribution, and selection of COPCs. The frequency of detection is listed as well as the minimum and maximum detected concentrations. The screening toxicity value is presented as well (e.g., the USEPA Region IX PRG) as additional information regarding other potential regulatory values. The last two

[7] 1,1,2 trichloroethane was identified 5 times in 138 groundwater samples with the maximum concentration at 8 ppb. 1, 2-dicloroethane was identified 9 times in 138 samples with the maximum concentration at 9 ppb. Benzene was identified twice in 138 samples with the maximum concentration at 4.8 ppb. These low frequencies of detection and relatively low concentrations do not justify retaining these compounds in the risk assessment for the given media. If 1,1,2 trichloroethane and 1,2- dichloroethane are breakdown products of TCE, then the results show these compounds are not preferential breakdown products. Furthermore, assessing the risk of TCE, a more toxic compound than 1,1, 2 trichloroethane or 1,2- dichloroethane, is more conservative then assessing risk of projected concentrations of these assumed breakdown products

[8] PAHs were removed from consideration because of the low concentrations that was detected and their minimal solubility which limits their transport in subsurface soils.

columns indicate whether the constituent was considered to be a COPC for the risk assessment or not and the reason for its inclusion or exclusion. Tables 2.20 through 2.30 present the second tier of the screening process.

Sediment samples were collected from various water bodies across the site, including Joachim Creek, the site pond, and other tributaries. Data from Joachim creek was evaluated separately because unlike the other bodies of water, Joachim Creek contains fish, and is used for recreational purposes. The results from samples collected from sediment in the creek indicated site related constituents did not exceed PRGs.

No screening was performed for radionuclides. USEPA Region IX PRGs are not available for radionuclides. All of the isotopes detected in the RI report were present in the ambient background as a result of naturally occurring and man-made radioactive materials (SAIC, 2007). However, in order to maximize the potential risk calculated for each exposure scenario, the contribution from background was included in the Risk Assessment.

Radioactive isotopes were identified in the water, both groundwater and surface water. The radioactive isotopes that were detected included uranium 238, radium 226 and technetium 99.[9] Plutonium 239/240 was not detected in the ground water samples at a detection limit of 0.01 pCi/liter. One sample of 32 identified the presence of neptunium 237 at a concentration of 0.02 pCi/liter. The radioactive isotopes identified in the soil, included uranium 238, uranium 235, uranium 234, thorium 232, thorium 230, thorium 228, radium 228, radium 226 and technetium 99.[10] Plutonium 239 and Neptunium 237 were not detected in the surface soil but was detected in the subsurface soil.

The presence of technetium 99 in the soil and groundwater was evaluated in 1996 as well as the RI in 2004. Technetium 99, which decays by beta radiation, is a byproduct of the nuclear fission of uranium-235 and has a half-life of 213,000 years. Technetium 99 contamination was present in commercial UF_6 as a result of US government recycling and re-enrichment activities at the gaseous diffusion plants (LBG, 1999).

[9] The progeny of thorium that emit gamma radiation were detected and found to be in secular equilibrium with their parent isotope. Thorium 228 and Radium 228 were found to be in secular equilibrium with their parent isotope, Thorium 232, respectively. Progeny of Uranium 238, especially Thorium 230 and Radium 226 were not in secular equilibrium.

[10] Thorium 228 and Radium 228 were found to be in secular equilibrium with their parent isotope, Thorium 232. Progeny of Uranium 238, especially Thorium 230 and Radium 226 were not in secular equilibrium. The observed concentration was used for the calculation of risk in Chapter 6 of this report.

For this risk assessment, it was determined that the key radionuclides would be retained as COPCs and the risk calculated for the HHRA. The key radionuclides that were included in the risk assessment included uranium and progeny, thorium and progeny, technetium, plutonium 239/240 and neptunium 237. For a sample where the radionuclide was reported to be at a concentration below the method detection limit, the detection limit was assigned as the reported concentration to calculate the UCL and the source term for the receptors.

For those radionuclides identified as COPCs, the activities used in the risk assessment are the measured EPCs; the contribution from background was not subtracted. This is a conservative approach such that the calculated risk is the incremental lifetime cancer risk, including the contribution of background. The observed risk is lower than the values calculated in Chapter 6 of this report because of the addition of natural background; this approach provides a conservative estimate of the risk from radionuclides.

4.0 Exposure Assessment

The objective of the exposure assessment is to quantify the type and magnitude of the total exposure by potential receptors to COPCs. These COPCs may be present at, or migrating from the Site or are present off site but may be due to Site-related activities, currently or at some time in the future if no further remedial actions were taken. The potentially exposed populations and exposure pathways to environmental media (e.g., soil, surface water/sediment, and groundwater) were identified in Section 2.0. In Section 4.1, the statistical analyses that are used to determine a conservative EPC are presented. Section 4.2 identifies the exposure pathways for each of the potential receptors being evaluated. In Section 4.3, the equations that are used to determine the Chronic Daily Intakes (CDI) of non-radiological COPCs and the total radiological intake and annual dose are presented, along with the exposure factor assumptions.

This baseline HHRA includes data collected site-wide as a single exposure unit. Evaluating data on a site-wide basis is appropriate to evaluate baseline risk to receptors. This is a conservative approach because sampling was biased toward known impacted areas. As a result, maximum concentrations of COPCs are well represented. Furthermore, exposure point concentrations (EPCs) were calculated using conservative approximations of the mean (i.e. 95 percent upper confidence limit.) Following completion of this site-wide baseline HHRA, individual exposure units will be identified and evaluated.

4.1 Exposure Point Concentrations

For quantitative human health risk assessments, the EPC, which is the concentration term used in the exposure equations, is the arithmetic average of the concentration that is contacted over the exposure period. The EPC is estimated from the arithmetic average concentration for a COPC based on a set of sampling results. Because of the uncertainty associated with estimating the true average concentration at a site, the 95 percent upper confidence limit (UCL) of the arithmetic mean is used for this variable for the reasonable maximum exposure (RME). The 95 percent UCL provides reasonable confidence that the true site average concentration will not be underestimated. The RME is the highest exposure that is reasonably expected to occur at a site and is intended to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures. The 95 percent UCL values were calculated using USEPA guidance (OSWER Directive 9285.6-10, USEPA, 2002). Specifically, the UCL was calculated using PRO-UCL, version 3.0, a computer program developed by the USEPA (USEPA, 2004a).

The following describes the EPC calculation process.

- First, the data was organized into EPC sets. An EPC set is a unique grouping of data (as shown in Table 1.3-1.4) and corresponding COPCs by media (as summarized in Table 2.1).
- Second, undetected concentrations were replaced with one-half of the detection limit as a proxy for the concentration.
- Third, the data were censored for outliers. One sample, GW-BD2-121604, was excluded in the EPC calculation because of a spike of PCE concentration in the sample and the resulting highly elevated analytical reporting limit. Inclusion of the data from this sample for compounds (i.e., proxy concentrations set at one-half of the highly elevated reporting limit) would cause the 95 percent UCL of all of the COPCs in groundwater to be overestimated.
- Fourth, the EPC data sets were imported into PRO-UCL, version 3.0. PRO-UCL calculates the 95 percent UCL by ten different methods. The methods assume either a normal, lognormal, gamma, or non-parametric distribution. PRO-UCL also tests the imported data for the appropriate distribution. The output (where is this documented)of PRO-UCL lists the 95 percent UCLs for each of the ten methods and recommends which of the ten UCLs should be used based on the distribution of the data. The recommended UCL was selected as the EPC term. In some instances the EPC data were subsequently modeled to convert the values to the appropriate exposure media. Section 4.1.1 discusses the models used further.

Tables 3.1 through 3.6 provide a summary of EPCs for each COPC contained within the data groupings for their respective completed exposure pathway. These tables include the number of samples for each EPC, the number on non-detects for each EPC, the statistical method used to determine the 95 percent UCL depending on the statistical distribution that fits the data, the 95 percent UCL, and the arithmetic average concentration. The PRO-UCL data output for each calculated value is included in Appendix A.

4.1.1 Exposure Point Concentration Models

Fate and transport models are needed to determine concentrations of COPCs in exposure media that have transferred to other media. For this HHRA, concentrations of COPCs transported to air from soil and groundwater were modeled to quantify potential inhalation risks. Calculation worksheets (Worksheet 3.1-3.8) were developed to show the model equations, input parameters,

and output. These worksheets are contained in Appendix B. The models used for each exposure scenario are discussed further below.

Shower/Bath Water to Indoor Air - Vapors

Henry's Law was used to model the vapor concentrations of VOCs in indoor air from tap water during a shower or bath. Henry's Law describes the volatility of a dilute species (e.g., <10 percent) in solution at equilibrium. The assumption of this model is that the breathing zone of a receptor in a shower or bath is near the interface at which equilibrium exists. Worksheets 3.1 and 3.2 show the calculation for tap water from overburden wells and bedrock wells, respectively.

Groundwater to Indoor Air - Vapors

To model indoor air vapor concentrations of VOCs, EPA's 2004 Johnson-Ettinger Model was used. The model simultaneously calculates the carcinogenic and noncarcinogenic risk for each COPC. Worksheets 8.1 and 8.2 in Appendix G contain summary tables for the output of the model. The corresponding calculation worksheet for each COPC is listed on Worksheets 8.1 and 8.2.

Groundwater to Outdoor Air - Vapors

To model outdoor air vapor concentrations of COPCs, chemical-specific volatilization factors were developed based on the method described by MDNR (MRBCA, 2005) and ASTM methods (ASTM E1739-95).[11] The volatilization factors describe the fraction of each COPC in groundwater that volatilizes to outdoor air. Worksheet 3.3 showS the calculation for groundwater in the overburden to outdoor air. Worksheet 3.7 shows the calculation of several effective diffusivities, which are needed to calculate the volatilization factors.

Surface Soil to Outdoor Air - Vapors

To model outdoor air vapor concentrations of COPCs, chemical-specific volatilization factors were developed based on the method described in the *Soil Screening Guide* (USEPA 1996b). The volatilization factors describe the fraction of each COPC in surface soil that volatilize to

[11] The vapor models used are valid when concentrations of contaminants are below the aqueous solubility limit or the soil saturation concentration. For PCE, only one groundwater and two soil samples exceeded the respective limits. However, the 95 percent UCLs used in the models are below the solubility and soil saturation limits.

outdoor air. Worksheet 3.4 shows the calculation for surface soil to outdoor air. Worksheet 3.8 shows the calculation of the apparent diffusivities of the COPCs, which are needed to calculate the volatilization factors.

Surface or Exposed Subsurface Soil to Outdoor Air - Particulates

To model outdoor air particulate concentrations of COPCs, a generic particulate emission factor was developed based on the method described in the *Soil Screening Guide* (USEPA 1996b). The particulate emission factor describes the fraction of each COPC in surface or exposed subsurface soil that becomes airborne in particulate form. Worksheet 3.5 shows the calculation of the particulate emission factor.

Subsurface Soil to Outdoor Air - Vapors

To model outdoor air vapor concentrations of COPCs, chemical-specific volatilization factors were developed based on the method described in the *Soil Screening Guide* (USEPA 1996b). The volatilization factors describe the fraction of each COPC in exposed subsurface soil that volatilize to outdoor air. Though this approach may overestimate the outdoor air concentrations due to undisturbed subsurface soil, the resulting risk associated with this model is below levels of concern (see Section 6.1 and 6.2 for more discussion of results). Worksheets 3.6 shows the calculation for subsurface soil to outdoor air. Worksheet 3.7 shows the calculation of the apparent diffusivities of the COPCs, which are needed to calculate the volatilization factors.

Subsurface Soil to Indoor Air - Vapors

To model indoor air vapor concentrations of VOCs, EPA's 2004 Johnson-Ettinger Model was used. The model simultaneously calculates the carcinogenic and noncarcinogenic risk for each COPC. Worksheets 8.3 and 8.4 in Appendix G contain summary tables for the output of the model. The corresponding calculation worksheet for each COPC is listed on Worksheets 8.3 and 8.4.

4.2 Exposure Equations and Parameters

Environmental medium-specific exposure algorithms were developed for each of the identified exposure route/pathways. Exposure algorithms are used to estimate chronic daily intake of non-radiological COPCs by receptors (e.g., industrial workers, adult and young child residents) in

potentially exposed populations. The exposure to radiological COPCs is assessed using basically the same algorithms and assumptions.

A Chronic Daily Intakes (CDI) is an exposure expressed as mass of a substance contacted per unit body weight per unit time, averaged over a long period of time (as a Superfund program guideline, seven years to a lifetime). For each exposure activity, the CDI, expressed as mg/kg-day, was an averaged daily dose of a COPC ingested or absorbed by a receptor. The averaged dose received by a receptor was the critical point estimate for determining the extent of health risk/hazard associated with exposure to each constituent.

Table 4.1 provides a summary of exposure factors used in estimating exposure intakes. As Table 4.1 illustrates, the Exposure Assessment has been completed using standardized variables selected from a variety of credible, peer reviewed sources, using the following decision hierarchy:

1) USEPA Guidance Documents (USEPA 1989; USEPA 1991; USEPA 1997; USEPA 2002; USEPA 2004);

2) Missouri Risk-Based Corrective Action Draft Program Document (MRBCA, 2005); and

3) Virginia Department of Environmental Quality Voluntary Remediation Program Document.

As seen in Table 4.1, the vast majority of exposure factor values have been adopted from well established, peer reviewed documents published by USEPA. State-derived exposure factors have been referenced only when the USEPA documents do not provide established values.

The following sections discuss the exposure equations to calculate receptor intakes. Tables 5.1-5.3 summarize the intakes calculated for each receptor. Worksheets 5.1-5.47 display the calculations for each receptor and exposure pathway intake. These worksheets are contained in Appendix C.

4.2.1 Inhalation of Outdoor Air: Vapors and Particulates

The exposure equation for the inhalation of outdoor air accounts for exposure to vapors and particulates from soil, groundwater, and surface water sources. The exposure equation can account for these different sources since the exposure medium (outdoor air) is the same for the sources. The intake equation for outdoor air exposure is

$$Intake = \frac{IR_{AO} \times EF \times ED \times ET_{OUT}}{BW \times AT}$$

where
IR_{AO} = outdoor inhalation rate of the receptor (m^3/hour)
EF = exposure frequency (days/year)
ED = exposure duration (years)
ET_{OUT} = exposure time that the receptor is outdoors (hours/day)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in air (mg/m^3) from each exposure source.

4.2.2 Incidental Ingestion of Soil

The exposure equation for the incidental ingestion of soil accounts for typical intakes of soil during normal daily activities according to each receptor. The intake equation for incidental ingestion of soil is

$$Intake = \frac{IR_{SOIL} \times EF \times ED \times FI \times CF}{BW \times AT}$$

where
IR_{SOIL} = ingestion rate of soil for the receptor (mg/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
FI = fraction of soil ingestion from source (unitless)
CF = conversion factor (kg/mg)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in surface soil (ppm) or subsurface soil depending upon the receptor.

4.2.3 Dermal Contact with Soil

The intake equation for dermal contact with soil is

$$Intake = \frac{SA_{SOIL} \times EF \times ED \times ET_{SOIL} \times CF \times AF}{BW \times AT}$$

where
SA_{SOIL} = skin surface area available for contact with soil (cm^2/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
ET_{SOIL} = exposure time for dermal contact with soil (hours/day)
CF = conversion factor (kg/mg)
AF = soil to skin adherence factor (mg/cm^2)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the dermal absorbed dose (DAD) for each receptor and COPC is calculated by

$$DAD = Intake \times Conc_{COPC} \times ABS$$

where
$Conc_{COPC}$ = concentration of the COPC in surface soil (ppm) or subsurface soil depending upon the receptor
ABS = chemical-specific absorption factor (unitless).

4.2.4 Ingestion of Groundwater

The exposure equation for the ingestion of groundwater describes intakes of groundwater at the tap. The intake equation for ingestion of groundwater is

$$Intake = \frac{IR_W \times EF \times ED}{BW \times AT}$$

where
IR_W = ingestion rate of water for the receptor (L/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb) according to each water bearing zone (overburden or bedrock).

4.2.5 Dermal Contact with Water

The exposure equation for dermal contact with groundwater describes different exposure scenarios for each receptor. For residents, the exposure equation describes the shower/bath scenario, where the full body is exposed and the hand-washing scenario, where only the hands are exposed. For commercial and industrial workers, the exposure equation describes typical contact with water at the tap on the job. For construction workers, the exposure equation describes incidental contact with groundwater when during excavation or other construction-related activities. The intake equation for dermal contact with groundwater is

$$DAD = \frac{DA_{EVENT} \times SA_W \times EF \times ED \times EV}{BW \times AT}$$

where
DAD = dermally absorbed dose (mg/kg-day)
DA_{EVENT} = absorbed dose per event (mg/cm^2-event)
SA_W = skin surface area available for contact with water (cm^2/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
EV = event frequency (events/day)
BW = body weight of the receptor (kg)
AT = averaging time (days).

The DA_{EVENT} is calculated according to the type of COPC.

For organics:

$$If\ t_{EVENT} \le t^*, then:\ DA_{EVENT} = 2 \times FA \times K_P \times C_{COPC} \quad \frac{6 \times \tau_{EVENT} \times t_{EVENT}}{\pi}$$

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

where
t_{EVENT} = event duration (hr/event)
t* = time to reach steady-state (hr)
FA = fraction absorbed water (dimensionless)
K_P = dermal permeability coefficient of compound in water (cm/hr)
τ_{EVENT} = lag time per event (hr/event)
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb)
B = ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

For inorganics:

$$DA_{EVENT} = K_P \times C_{COPC} \times t_{EVENT}$$

where
t_{EVENT} = event duration (hr/event)
K_P = dermal permeability coefficient of compound in water (cm/hr)
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb).
where
t_{EVENT} = event duration (hr/event)
K_P = dermal permeability coefficient of compound in water (cm/hr)
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb)

Note: Event duration (t_{EVENT}) and event frequency (EV) are derived from the event time (ET) for dermal contact with water, which is shown on Table 4.1. The relationship is as follows:

$$ET = t_{EVENT} \times EV$$

4.2.6 Inhalation of Indoor Vapors

The exposure equation for the inhalation of indoor air accounts for exposure to vapors from soil and groundwater that travel through foundation cracks into the structure. The exposure equation can account for these different sources because the exposure medium (indoor air) is the same for the sources. The intake equation for outdoor air exposure is

$$Intake = \frac{IR_{AI} \times EF \times ED \times ET_{IN}}{BW \times AT}$$

where
IR_{AI} = indoor inhalation rate of the receptor (m^3/hour)
EF = exposure frequency (days/year)
ED = exposure duration (years)
ET_{IN} = exposure time that the receptor is indoors (hours/day)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in air (mg/m^3) from each exposure source.

4.2.7 Inhalation of Indoor Vapors from Tap Water

The exposure equation for the inhalation of indoor air accounts for exposure to vapors from tap water during bathing or showering. The intake equation for this exposure is

$$Intake = \frac{IR_{AI} \times EF \times ED \times ET_{W}}{BW \times AT}$$

where
IR_{AI} = indoor inhalation rate of the receptor (m^3/hour)
EF = exposure frequency (days/year)
ED = exposure duration (years)
ET_{W} = exposure time that the receptor is bathing or showering (hours/day)
BW = body weight of the receptor (kg)

AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in air (mg/m^3) from the tap water source.

4.2.8 Incidental Ingestion of Surface Water

The exposure equation for incidental ingestion of surface water describes surface water intake for a swimming scenario. The intake equation for incidental ingestion of surface water is

$$Intake = \frac{IR_{SW} \times EF_{SW} \times ED \times ET_{SW}}{BW \times AT}$$

where
IR_{SW} = ingestion rate of water for the receptor (L/hour)
EF_{SW} = exposure frequency (days/year)
ED = exposure duration (years)
ET_{SW} = exposure time for swimming (hours)
BW = body weight of the receptor (kg)
AT = averaging time (days).

Therefore, the CDI for each receptor and COPC is calculated by

$$CDI = Intake \times Conc_{COPC}$$

where
$Conc_{COPC}$ = concentration of the COPC in surface water (ppb).

4.2.9 Dermal Contact with Surface Water

The exposure equation for dermal contact with surface water describes exposure to surface water for a swimming scenario or incidental contact depending on receptor. The intake equation for dermal contact with surface water is

$$DAD = \frac{DA_{EVENT} \times SA_W \times EF \times ED \times EV}{BW \times AT}$$

where
DAD = dermally absorbed dose (mg/kg-day)
DA_{EVENT} = absorbed dose per event (mg/cm^2-event)
SA_W = skin surface area available for contact with water (cm^2/day)
EF = exposure frequency (days/year)
ED = exposure duration (years)
EV = event frequency (events/day)
BW = body weight of the receptor (kg)
AT = averaging time (days).

The DA_{EVENT} is calculated according to the type of COPC.

For organics:

$$If\ t_{EVENT} \le t^*, then:\ DA_{EVENT} = 2 \times FA \times K_P \times C_{COPC} \quad \frac{6 \times \tau_{EVENT} \times t_{EVENT}}{\pi}$$

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

where
t_{EVENT} = event duration (hr/event)
t* = time to reach steady-state (hr)
FA = fraction absorbed water (dimensionless)
K_P = dermal permeability coefficient of compound in water (cm/hr)
τ_{EVENT} = lag time per event (hr/event)
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb)
B = ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

For inorganics:

$$DA_{EVENT} = K_P \times C_{COPC} \times t_{EVENT}$$

where
t_{EVENT} = event duration (hr/event)
K_P = dermal permeability coefficient of compound in water (cm/hr)

$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb).
where
t_{EVENT} = event duration (hr/event)
K_P = dermal permeability coefficient of compound in water (cm/hr)
$Conc_{COPC}$ = concentration of the COPC in groundwater (ppb)

The Event duration (t_{EVENT}) and event frequency (EV) are derived from the event time (ET) for dermal contact with water, which is shown on Table 4.1. The relationship is as follows:

$$ET = t_{EVENT} \times EV$$

4.2.10 Radionuclide Exposure

Pathways for exposure to radionuclides are available from some of the same pathways as described for chemical COPCs as defined in the previous sections. Radionuclides were encountered in the groundwater, surface water, surface soil and subsurface soil. The radionuclides were present in the form of solids in the soil or water; technetium 99 was found to be soluble in water. The major pathways for exposure were ingestion, inhalation, and direct external exposure. The radionuclides were assumed to be absorbed through the skin.

USEPA presents methods for estimating risk to human health for radionuclide exposure (USEPA, 1989a, USEPA, 1991) and recommends the use of appropriate models and site-specific information to refine the risk assessments. The ingestion pathway was evaluated as described in Section 4.3.2 and 4.3.4 for water and soil, respectively. One appropriate computer model that can be used is the RESRAD (RESidual RADiation) Model. RESRAD is a computer code developed by Argonne National Laboratory that calculates radiation dose and excess lifetime cancer risk. Both the external gamma radiation and inhalation of airborne soil and sediment particulates pathways were modeled using the RESRAD computer program (Argonne, 2001). The inhalation rate was the same as that used for the chemical risk assessment: 20 m^3/day or 7,200 m^3/year (USEPA 1997a). The exposure frequency for inhalation and external gamma radiation was 350 days a year. This time is divided between indoors and outdoors. It was assumed that, on average, half of each day was spent indoors at the home, one quarter of each day was spent outdoors, and one quarter of each day was spent away from the home.

Other RESRAD input parameters used in the external gamma and inhalation pathways were the same as used previously. This approach was used for the exposure scenarios involving the surface soil for both the resident and construction worker. Potential exposures to surface soil were evaluated using samples from the RI collected at a depth of 0 to 15 cm. This depth was

then used in the subsequent risk assessments including an input parameter for RESRAD. USNRC and USEPA defines surface soil as the top 15 centimeters. The top 15 cm was also considered in terms of contribution to pathways such as dust inhalation, ingestion and particulates. USEPA defines surface soil as the top 2 centimeters, as defined by Urban Soil Lead Abatement Project (USEPA, 1993). In the Soil Screening Guidance, the USEPA explained that additional sampling beyond 2 cm may be appropriate for surface soils under a future residential use scenario in areas where major soil disturbances could reasonably be expected as a result of landscaping, gardening, or construction activities. It is important to be cognizant of local residential construction practices when determining the depth of surface soil sampling and to weigh the likelihood of that area being developed (USEPA, 1996b).

The dermal uptake of radionuclides, which have low permeability constants, was not an important route of uptake for radionuclides (USEPA, 1989a). Dermal uptake of radionuclides is not evaluated in this risk assessment. Likewise, radionuclides present at WEC were not volatile and inhalation of groundwater was not considered a significant exposure route. The radiation dose, and resulting risk, was calculated by the ingestion pathway.

5.0 Toxicity Assessment

The toxicity assessment evaluates the potential for the COPCs to cause adverse health effects in exposed individuals and establishes a relationship between exposure to a constituent and the increased likelihood and severity of induced adverse health effects. Two broad categories of chemically induced disease states were considered, including cancer and non-cancer health effects. Both categories were evaluated in the toxicity assessment for each identified COPC. In the same way that an exposure assessment attempts to define the chronic lifetime dosage of COPCs received by an individual in a given scenario, the toxicity assessment links adverse effects associated with exposure to the particular COPC. Establishing an association between exposure to a constituent and the possible adverse effects is the goal of toxicology. The dose received determines the magnitude of any anticipated adverse effects related to the constituent's inherent toxicity.

5.1 Chemical Toxicity

Toxicity values are used in risk characterization to quantify the probability of observing cancer and non-cancer effects in a potentially exposed population. Two types of toxicity values are used to express a COPCs dose-response-effect relationship:

- Slope Factor (SF) is a plausible upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime. The slope factor is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime of exposure to a particular level of a potential carcinogen. The slope factor is expressed in the units of $(mg/kg\text{-}day)^{-1}$ for non-radiological contaminants and $(pCi)^{-1}$ for radiological contaminants for estimating the likelihood of carcinogenic effects; and

- Reference Dose (RfD), reported in mg/kg-day, or Reference Concentration (RfC), expressed in mg/m^3, are estimates of the amount of exposure to which a person (including sensitive subpopulations) could be exposed to on a daily basis where adverse non-carcinogenic health effects (e.g., organ damage, biochemical alterations, birth defects) would not be expected. RfDs and RfCs are used in estimating possible non-carcinogenic effects from non-radiological contaminants.

In general, SF and RfD values are derived from long-term animal studies. These studies incorporate uncertainty factors to compensate for extrapolation of observed adverse effects in laboratory animals to estimate possible adverse effects in humans. Where available, the SF and RfD values for studies involving humans may be used to reduce uncertainty.

For this toxicity assessment, toxicity values (TVs) such as SFs, cancer classifications, RfDs were selected from a variety of credible sources, each presenting varying degrees of confidence, with final selection based on the following hierarchy recommended by the USEPA (USEPA, 2003), including:

- Tier 1 - USEPA's IRIS (Integrated Risk Information System);
- Tier 2 - USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs); and
- Tier 3 - Additional EPA sources (e.g., historic HEAST and NCEA provisional values) and non-EPA sources of toxicity information (e.g., California EPA or Missouri RBCA toxicity values).

When Tier 1 and Tier 2 sources failed to yield a published toxicity value (TV), those published within USEPA Region IX 2004 PRG Tables, which include California EPA TVs as a peer reviewed Tier 3 source, were adopted for use. This decision was based on the premise that a Tier 3 source introduces a relatively higher degree of uncertainty, as they have yet to attain the level of confidence provided by the more established Tier 1 and 2 sources, and making use of USEPA Region IX TVs offers a more protective approach to human health. If USEPA Region IX tables did not offer a TV, additional sources such as the MRBCA tables were referenced for default TVs.

Because toxicity values for dermal exposure are rarely available (appropriate toxicity data are scarce), the oral RfD and SF are adjusted to an absorbed dose, using constituent-specific oral absorption efficiency, as recommended by and provided within the USEPA RAGS Part E (USEPA, 2004b), to derive an adjusted RfD and SF to assess dermal exposure. Table 6.1 displays constituent-specific absorption efficiencies for dermal exposure.

Carcinogenic and non-carcinogenic toxicity effects information for the COPCs are listed in Table 6.1 as well. COPC property information is listed in Table 6.2. Carcinogenic toxicity information for radiological COPCs is listed in Table 6.3.

Cancer risks are expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the potential carcinogen (i.e., excess individual lifetime cancer risk). In carcinogen assessment, USEPA evaluates the available data to determine the likelihood that an agent is a human carcinogen. Under the revised carcinogen risk assessment

guidelines (USEPA 1999a), standard descriptors are used as part of the weight-of-evidence narrative. These standard descriptors are summarized as follows:

Carcinogenic to humans – when there is convincing evidence demonstrating causality between human exposure and cancer, or when there is compelling evidence of causality in animals and mechanistic information in animals and humans demonstrating similar modes of action.

Likely to be carcinogenic to humans – when the available data are adequate to demonstrate carcinogenic potential to humans.

Suggestive evidence of carcinogenicity, but not sufficient to assess human carcinogenic potential – when the evidence from either human or animal data is only suggestive of carcinogenicity. In such cases data is insufficient to determine dose-responses or to determine human carcinogenic potential.

Data are inadequate for an assessment of human carcinogenic potential – when available data are inadequate to perform an assessment. Often there is either a lack of pertinent or useful data or there is evidence of conflicting data.

Not likely to be carcinogenic to humans – when the data are considered sufficiently strong for making a conclusion that there is no carcinogenic human hazard concern.

Most of the available toxicity information (e.g. IRIS) was developed prior to the implementation of the revised cancer guidelines. This toxicity information is based on a USEPA's previous classification scheme of the overall weight-of-evidence:

Group A - Human Carcinogen - Sufficient evidence from epidemiological studies substantiated by causal association between exposure and carcinogenicity.

Group B1 - Probable Human Carcinogen - Limited evidence of carcinogenicity in humans from available epidemiological data.

Group B2 - Probable Human Carcinogen - Sufficient evidence of carcinogenicity in animals, but inadequate or no evidence in humans.

Group C - Possible Human Carcinogen - Limited evidence of carcinogenicity in animals.

Group D - Not Classified - Inadequate evidence of carcinogenicity in animals to support classification.

Group E - Not a Human Carcinogen - No evidence of carcinogenicity in at least two adequate animal tests in different species or in both epidemiological and animal studies.

Based on the evidence that a constituent is a known or likely to be a human carcinogen, the USEPA calculates a toxicity value that defines a quantitative relationship between dose and response (i.e., SF). An SF converts estimated daily intakes averaged over a human lifetime of exposure directly to incremental risk of an individual developing cancer. A critical assumption of this approach is that the dose-response relationship is a linear relationship in the low-dose portion of the dose-response curve. Under this assumption, the SF is a constant, and risk is directly related to intake. Thus, the linear form of the carcinogenic risk equation is usually applicable for estimating site risks. This linear low-dose equation is defined for non-radiological contaminants as:

$$Risk = CDI \times SF$$

where:
Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer over a lifetime
CDI = chronic daily intake averaged over 70 years (mg/kg-day)
SF = slope factor, expressed in $(mg/kg\text{-}day)^{-1}$

The collective carcinogenic risk from exposure to several non-radiological constituents is calculated by adding the individual cancer risks for each constituent in the medium identified in each appropriate exposure pathway assessment and then summing the total carcinogen risk for all relevant exposure pathways.

$$Risk_T = \sum Risk_{ij}$$

where:
$Risk_T$ = the total cancer risk, expressed as a unitless probability, and
$Risk_{ij}$ = the risk estimate for the ith constituent in the jth exposure medium pathway

The resulting summation of constituent-specific cancer risks is a very conservative upper-bound estimate of cancer risk for the following reason. Each SF is an upper 95th percentile estimate of

potency, and, because percentiles of probability distributions are not strictly additive, the total cancer risk estimate becomes more conservative as the number of cancer risk estimates increases. While this may appear to be overly conservative, this method is used to ensure that carcinogenic risks will not be underestimated. Likewise, the increased lifetime cancer risk from radiological constituents is given by the following equation:

$$Risk = Intake \times SF$$

where:
Risk = a unitless probability (e.g., 1×10^{-6}) of an individual developing cancer over a lifetime
Intake = total lifetime intake above background (pCi)
SF = slope factor, expressed in $(pCi)^{-1}$

The total cancer risk from both radiological and non-radiological constituents is calculated by summing the individual cancer risks for all contaminants (both radiological and non-radiological) across all exposure media and pathways.

To evaluate non-carcinogenic effects, a chronic RfD or RfC is an estimate of the daily exposure to a human population, including any sensitive subpopulation that is unlikely to cause an increased incidence of deleterious health effects during a lifetime of exposure. Chronic RfD or RfC values are specifically developed to be protective for long-term exposure to a constituent.

To characterize low-dose exposure effects, the "no observed adverse effect level" (NOAEL) and the "lowest observed adverse effect level" (LOAEL) are evaluated. The NOAEL is an exposure level where there are no statistically or biologically significant increases in the frequency or severity of adverse effects in the exposed population. The LOAEL is the lowest exposure dose in a dose-response experiment at which there are statistically or biologically significant increases in severity or frequency of adverse effects in the exposed population.

For non-carcinogenic constituents, the measure used to describe the potential for non-carcinogenic toxicity to occur in an individual is evaluated by comparing the estimated exposure level over a specified time period (e.g., lifetime) with the appropriate non-cancer toxicity value (i.e., RfD or RfC).

This ratio of exposure to toxicity is called a non-cancer hazard quotient (HQ):

$$HQ = \frac{CDI}{RfD}$$

where:
HQ = hazard quotient
CDI = chronic daily intake (mg/kg-day)
RfD = Reference Dose

The non-carcinogenic HQ assumes that there is a level of exposure (i.e., RfD or RfC) below which it is unlikely for even sensitive subpopulations to experience adverse health effects.

For assessing the health impacts of several non-carcinogenic constituents, RfDs or RfCs are compared to exposure-specific intake rates of each COPC. A summation of these HQs is termed the hazard index (HI). The aggregate HI is expressed as:

$$HI_T = \sum \frac{CDI_{ij}}{RfD_j}$$

where:
HI_T = total hazard index for exposure scenarios for an individual
CDI_{ij} = chronic daily exposure for the ith constituent in the jth exposure pathway
RfD_i = Reference dose for the ith constituent

Accordingly, the HI is the sum of HQs for substances that affect the same target organ or organ system. Because different COPC may cause similar adverse health effects, it is often appropriate to combine hazard quotients associated with different substances. If this ratio of the daily intake to the RfD or RfC exceeds 1.0 (unity) for the defined exposure scenario, this provides an indication that the exposed receptor may be subject to an adverse health impact and that further investigation should be undertaken. If the ratio is below unity, then it is generally assumed that no adverse impact to human health has or will occur.

The HI approach does have limitations and should be interpreted carefully based on the known aspects of additive toxic effects from exposure to mixtures of chemicals. First, because both the HQ and HI are ratios, after unity has been exceeded, the magnitude of the index has little bearing on the potential severity of adverse effects that may be anticipated. An HI of five does not indicate the non-cancer hazard is greater than a HI of three. Secondly, it is inappropriate to sum non-cancer HQs for constituents that do not have similar toxic modes of action or that do not

affect the same organ system. Additionally, there may be synergistic effects, which, though not directly affecting the same organ system, may increase the risk from one constituent based on the presence or effect of some other constituent.

5.2 Radiological Toxicity

The USEPA published radionuclide-specific risk coefficients or slope factors in Federal Guidance Report No. 13 (FGR 13) (USEPA, 1999b). These factors were used to convert EPC to radiation dose and cancer risk. It includes separate coefficients for water and food ingestion, inhalation, and external exposure for over 800 radionuclides.

The dose conversion factors and slope factors for the isotopes used in this risk assessment are provided in Table 6.3. These risk coefficients are recommended for use whenever a quantitative risk assessment is required.[12],[13] Values from FGR 13 are provided for both ingestion of tap water as well as dietary intake. While the factors are similar regardless of the source of intake, the dietary values were higher than those provided for the ingestion of tap water, except for a young child. The slope factors for a child, ages 0-5, were higher for tap water compared to dietary ingestion. A resident child was described in Section 2.2 as a child six (6) years of age. Consequently, the calculation of risk in Table 6.3 and Worksheets 7.84 through 7.103 used the greatest slope factor (risk per microcurie) from FGR 13 for either tap water or dietary ingestion. This provided a conservative or slightly higher risk than using the slope factors for both the tap water and dietary ingestion.

A mortality risk coefficient is an estimate of the risk of dying of cancer as a result of intakes of the radionuclide or external exposure to its emitted radiations for an average member of the U.S. population. The coefficient is normalized to a unit activity intake by inhaled or ingested or per unit time-integrated activity concentration in air or soil. A morbidity risk coefficient is an estimate of the risk of experiencing a radiogenic cancer as a result intakes of the radionuclide or external exposure to its emitted radiations for an average member of the U.S. population. The coefficient is normalized to a unit activity intake by inhaled or ingested or per unit time-integrated activity concentration in air or soil. The risk coefficients apply to an average member of the public, in the sense that estimates of risk are averaged over the age and gender

[12] The risk coefficient for a given radionuclide, environmental medium, and mode of exposure, is the estimated probability of radiogenic cancer mortality or morbidity, per unit activity intake for internal exposures or per unit exposure for external exposures.

[13] The time integral of the effective dose rate is calculated over a fixed time period following a unit activity intake of a radionuclide. The integration time is 50 years for adults and from intake to 70 years for children.

distributions of a hypothetical close stationary population whose survival functions and cancer mortality rates are based on recent data for the United States. The risk coefficients tabulated in FGR-13 are applicable to either chronic or acute exposure to a radionuclide. That is, a coefficient may be interpreted either as the average risk per unit exposure to members of the population throughout life to a constant concentration of the radionuclide in an environmental medium or as the average risk per unit exposure to members of a population acutely exposed to the radionuclide in the environmental medium. For purpose of computing the risk coefficients, it is assumed that the concentration of the radionuclide in the environmental remains constant and that all persons in the population are exposed to that environmental medium throughout their lifetimes.

The cancer risk coefficients in FGR 13 are calculated using the more recent age-specific dose models developed for ICRP Publication 72 and its supporting publications with the age-specific radiation carcinogenesis models adopted by USEPA (ICRP, 1996). The Interagency Steering Committee on Radiation Standards (ISCORS) compared the estimate of radiation risk, (FGR 13) with the previous methods of estimating radiation exposure (FGR 11 and FGR 12) (ISCORS, 2002), and concluded that the risk coefficients published in FGR 13 should be used for situations in which a radiation risk assessment was required to make risk management decisions. The results provided in Chapter 6.3 of this report reflect the use of the risk coefficients from FGR 13. The input parameters for RESRAD also included cancer risk coefficients from FGR 13. The radiation dose conversion factors were selected from FGR 13 and provided in this assessment as a point of comparison. The risks from radioactive materials were calculated using slope factors from FGR 13 rather than converting a risk from radiation dose.

Because radiation exposure, if high enough, is associated with an increased risk of cancer, the radiological risk of interest is the risk of incurring fatal cancer. Hypothetically, the risk of harm caused by radiation exposure increases as the exposure increases.[14] However, no effects have ever been observed at levels below 5,000 millirem delivered over a one year period.[15,16] In fact, the effects seen when humans are exposed to 100,000 millirem over a very short time period are

[14] This linear relationship between dose and effect is clearly demonstrated in populations that have received large, acute exposures.

[15] Health Physics Society, "*Radiation Risk in Perspective*", Position Statement of the Health Physics Society, January, 1996 (revised August, 2004).

[16] Health Physics Society, "*Compensation for Diseases that Might be Caused by Radiation Must Consider the Dose*", Position Statement of the Health Physics Society, March, 2000 (Reaffirmed, March, 2001).

temporary and reversible. It takes a short-term dose on the order of 500,000 millirem (without medical intervention) to cause death.[17]

The radiation dose potential to even the maximally-exposed individual is far too low to result in demonstrable health effects. Nonetheless, the LNT, or "Linear No Threshold" hypothesis provides a useful risk assessment tool. In essence, this hypothesis states that since scientists have observed a linear relationship between radiation dose and effect at high doses and dose rates, and since a "radiation free" environment to test the theory at low doses (taken to be 20,000 millirem TEDE or less) does not exist, for radiation protection purposes it is reasonably conservative to assume that the relationship is indeed linear. While the LNT hypothesis leads to the obvious conclusion that any radiation dose, no matter how small, may be capable of causing some biological damage or detriment - a conclusion that is not supported with facts - it nonetheless offers a conservative risk coefficient that is useful for this assessment.

[17] International Commission on Radiological Protection, ICRP Publication 60, "*1990 Recommendations of the International Commission*", Pergamon Press, 1991.

6.0 Risk Characterization

6.1 Health Hazards and Non-Radiological Cancer Risks

Sections 6.1.1 through 6.1.12 explain the human health hazards and non-radiological cancer risks associated with each exposure medium and route. Table 7.1 presents a summary of risks for each exposure pathway and receptor. Worksheets 7.1 through 7.83 present the incremental cancer risks and HQs for each COPC, exposure pathway, and receptor. These worksheets are presented in Appendix D.

6.1.1 Ingestion of Groundwater

Future residents and commercial/industrial workers may ingest impacted drinking water if domestic wells are installed at the Site and water from these wells is used in lieu of the public water supply currently available at the Site. Similar exposures could also occur if, in the future, current institutional controls are lost and off-site residents or commercial/industrial workers would ingest groundwater from impacted bedrock downgradient of the Site.

For these receptors, the total cancer risk for ingestion of groundwater from bedrock wells is in the order of 10^{-2}. This risk exceeds the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs exceed unity by one to two orders of magnitude for ingestion of groundwater.

6.1.2 Dermal Contact with Groundwater

Future residents and commercial/industrial workers may come into contact with impacted tap water if domestic wells are installed at the Site and water from these wells is used in lieu of the public water supply currently available at the Site. Similar exposures could also occur if, in the future, current institutional controls are lost and off-site residents or commercial/industrial workers would use groundwater withdrawn from impacted bedrock downgradient of the Site.

For residents, the total cancer risk for dermal contact with groundwater is in the order of 10^{-3}. This risk exceeds the acceptable range of 10^{-6} to 10^{-4} for ILCR. For commercial/industrial workers, the total cancer risk for dermal contact with groundwater is in the order of 10^{-4}. This risk is at the upper limit for an acceptable ILCR. For residents and commercial/industrial workers, the respective total HQs exceed unity by at most one order of magnitude for dermal contact with groundwater.

Construction workers may come into contact with impacted overburden groundwater during construction-related activities at the Site. The total cancer risk for dermal contact with groundwater from overburden is in the order of 10^{-5}. This risk is within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQ, however, exceeds unity.

6.1.3 Inhalation of Indoor Air Vapors during Bathing or Showering

Future potential residents may inhale vapors from groundwater during bathing or showering if domestic wells are installed at the Site and water from these wells is used in lieu of the public water supply currently available at the Site. Similar exposures could also occur if, in the future, current institutional controls are lost and off-site residents would use groundwater withdrawn from impacted bedrock down-gradient of the Site.

For residents, the total cancer risk for inhalation of indoor air vapors from groundwater during bathing or showering is in the order of 10^{-1}. This risk exceeds the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs exceed unity by two to three orders of magnitude for this exposure route.

6.1.4 Inhalation of Indoor Air Vapors from Groundwater

Future residents and commercial/industrial workers may inhale vapors from overburden groundwater when buildings are built atop an impacted area. For residents, the total cancer risk for indoor inhalation from overburden groundwater is in the order of 10^{-4}. This risk exceeds the acceptable range of 10^{-6} to 10^{-4} for ILCR. For commercial/industrial workers, the total cancer risk for indoor inhalation from overburden groundwater is in the order of 10^{-4}. This risk is at the upper limit for an acceptable ILCR. For residents and commercial/industrial workers, the respective total HQs are in the order of 10^{-1}.

6.1.5 Inhalation of Outdoor Air Vapors from Groundwater

All of the receptors considered in this HHRA may inhale outdoor vapors from overburden groundwater when conducting outdoor activities at the site. For the receptors, the total cancer risk for outdoor inhalation from overburden groundwater is in the range of 10^{-7} to 10^{-5}. These risks are below or within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs for each receptor are in the range of 10^{-2} to 10^{-4}, which are well below unity. Accordingly, outdoor inhalation of vapors from groundwater is not a human health hazard for any of the receptors for this HHRA.

6.1.6 Incidental Ingestion of Soil

All of the receptors considered in this HHRA may incidentally ingest surface soil during outdoor activities. For the receptors considered, the total cancer risk for incidental ingestion of surface

soil is in the range of 10^{-6} to 10^{-5}. These risks are within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs for each receptor are below unity, with the exception of the resident child with a HQ at 1.27.

Construction workers may come into contact with impacted subsurface soil during construction-related activities at the site. The total cancer risk for incidental ingestion of subsurface soil by a construction worker is of the order 10^{-7}. This risk is below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQ is below unity by two orders of magnitude.

6.1.7 Dermal Contact with Soil

All of the receptors considered in this HHRA may come into contact with impacted surface soil during outdoor activities. For the receptors, the total cancer risks for dermal contact with surface soil are in the range of 10^{-7} to 10^{-5}. These risks are below or within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are below unity by one to three orders of magnitude.

Construction workers may come into contact with impacted subsurface soil during construction-related activities at the site. The total cancer risk for dermal contact with subsurface soil is in the order of 10^{-10}. This risk is within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQ is below unity by three orders of magnitude.

6.1.8 Inhalation of Indoor Air Vapors from Soil

Future residents and commercial/industrial workers may inhale vapors from subsurface soils when buildings are built atop an impacted area. For residents and commercial/industrial workers, the total cancer risk for indoor inhalation from subsurface soil is in the order of 10^{-5}. These risks are within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are below unity by two orders of magnitude.

6.1.9 Inhalation of Outdoor Air Vapors from Soil

All of the receptors considered in this HHRA may inhale outdoor vapors from surface soil when conducting outdoor activities at the site. For the receptors considered, the total cancer risks for outdoor inhalation from surface soil range from 10^{-10} to 10^{-8}. These risks are below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are zero because non-cancer toxicological values for this pathway and COPCs are not available.

All of the receptors considered in this HHRA may inhale outdoor vapors from subsurface soil when conducting outdoor activities at the site. For the receptors considered, the total cancer risks for outdoor inhalation of vapors from subsurface soil range from 10^{-9} to 10^{-7}. These risks

are below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are below unity by three to five orders of magnitude.

6.1.10 Inhalation of Outdoor Air Particulates from Soil

All of the receptors considered in this HHRA may inhale outdoor particulates from surface soil when conducting outdoor activities at the site. For the receptors considered, the total cancer risks for outdoor inhalation of particulates from surface soil range from 10^{-10} to 10^{-8}. These risks are below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are below unity by three to five orders of magnitude.

Construction and agricultural workers may inhale outdoor particulates from subsurface soil when conducting job-related activities at the site. For a construction worker, the total cancer risk for outdoor inhalation of particulates from subsurface soil is in the order of 10^{-10}. For an agricultural worker, the total cancer risk for outdoor inhalation of particulates from subsurface soil is in the order of 10^{-9}. These risks are below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are well below unity at 10^{-9}.

6.1.11 Incidental Ingestion of Surface Water/Sediment

All of the receptors considered in this HHRA may incidentally ingest surface water/sediment during outdoor activities. For the receptors considered, the total cancer risk for incidental ingestion of surface water/sediment ranges from 10^{-9} to 10^{-7}. These risks are below the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs for each receptor are two to three orders of magnitude below unity.

6.1.12 Dermal Contact with Surface Water/Sediment

All of the receptors considered in this HHRA may come into contact with impacted surface water/sediment during outdoor activities. For these receptors, the total cancer risks for dermal contact with surface water/sediment are in the range of 10^{-8} to 10^{-6}. These risks are below or within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The respective total HQs are below unity by two to three orders of magnitude.

6.2 Lead Health Hazards

The health hazards associated with lead were evaluated apart from the main portion of the risk assessment due to the sensitive population effected by exposure to lead. As recommended by the USEPA (USEPA, 1998a) the Integrated Exposure Uptake Biokinetic (IEUBK) model was used to evaluate blood-lead levels in children from six months to seven years of age.

The exposure routes considered in this model were ingestion of surface soil and groundwater and inhalation of dust. Site-specific soil (EPC set 6) and groundwater concentrations (EPC set 1, groundwater in overburden, was used for the calculation – lead was not detected in bedrock groundwater data) were input into the model. IEUBK model default exposure factors were used. The model was run with a time step of once a day.

The text output and probability density plot is presented in Appendix E. The text output displays the total lead intake and the corresponding blood-lead level for each year childhood year. The probability density plot shows the likelihood of exposures given the site-specific soil and groundwater concentrations. The blood-lead level of concern of 10 microgram per deciliter (ug/dL) is also shown on the plot. The USEPA (1998a) has established a recommended health protection goal concerning blood-lead levels for children. The goal is for children to have a <5 percent chance of exceeding a blood-lead concentration of 10 ug/dL. The probability density plot for the site shows that a child will have a 1.032 percent chance of exceeding a blood-lead concentration of 10 ug/dL. This probability is below USEPA's recommended health protection goal. This indicates that the site does not pose an unacceptable lead health hazard to children. Children are more sensitive to lead health hazards in the environment than adults, therefore, the lead health hazard to adults was not evaluated.

6.3 Radiological Risk Assessment

The total dose and total cancer risks associated with radiation exposure from environmental media under current and future land-use scenarios are presented in this section. The total dose is expressed as the annual Total Effective Dose Equivalent (TEDE), which is the sum of the dose from all sources both internal and external averaged over the exposure period and expressed in mrem/yr. In this section, the dose and risk from the applicable pathways are summed to present an assessment of the total dose (i.e., TEDE) and risk. The total radiological dose and risk estimates based on RME exposure factors are presented in Tables 7.1; the worksheets to calculate the radiation risk for each scenario is provided in Appendix D, Table 7.84 through 7.103. [18]

The exposure to radioactive materials is characterized by the CSM and the exposure equations described in Section 4.2 of this report. Several receptors had potential exposures to external radiation and the inhalation of dust; these pathways were modeled using a computer code. Specifically, the computer code RESRAD was used to calculate radiological doses for the

[18] The radiation exposure was calculated for the entire exposure period in the Tables provided in Appendix D. For the purposes of comparison, the radiation dose was divided by the assumed duration of exposure and presented as a dose rate in units of millirem per year.

inhalation and external gamma radiation pathways evaluated, and to estimate corresponding ILCR for the identified potentially exposed populations for those pathways (Argonne, 2001). RESRAD evaluated exposure through inhalation of soil particulates and dusts, and external gamma exposure from radionuclides in soil for each of the potentially exposed populations. In this section, dose and risk estimates are presented for exposures to the reasonable maximum exposed individuals. The results were calculated in a deterministic manner in order to be comparable with the risks calculated for the chemical COPCs. There was no attempt to develop a range of results using the probabilistic modules available in the RESRAD code.

6.3.1 Ingestion of Groundwater

Future residents may be exposed to contaminants in groundwater if they use private wells as their drinking water and household-use source. Dermal uptake of radionuclides from groundwater does not represent a significant exposure pathway because of the low permeability of radionuclides through the skin barrier.

The annual radiation doses from groundwater for future residents are summarized in Table 7.1. These range from 0.3 to 2.9 mrem/yr. The potential RME annual doses for the bedrock wells for future on-site resident adults, young children, and construction workers are 1.0, 0.9 and 0.3 mrem/yr, respectively.

The increased lifetime cancer risk from radionuclides in groundwater for future on-site resident adult, young child, and construction worker are summarized in Appendix D, Tables 7.84 through 7.89 for the reasonable maximum exposed individuals. The increased lifetime cancer risk from radionuclides in groundwater from the bedrock wells based on RME exposure factors for the future on-site resident adults, young children, and construction workers are $3x10^{-5}$, $1x10^{-5}$ and $1x10^{-5}$, respectively. The potential uncertainty in the risk assessment concerning the use of the data from an extended area and various well depths is addressed in Section 6.5 of this report.

6.3.2 Ingestion of Surface Water

Future residents may be exposed to contaminants in the surface water if they wade in the Joachim Creek or swim in the site pond. Dermal uptake of radionuclides from surface water does not represent a significant exposure pathway because of the low permeability of radionuclides through the skin barrier.

The annual radiation doses from surface water for future on-site or off-site residents are summarized in Table 7.90 and 7.94. The RME results for the future on-site resident adults and young children are 0.3 and 0.3 mrem/yr, respectively.

The increased lifetime cancer risks from radionuclides in surface water for future on-site resident adults, and young children, are summarized in Appendix D, Tables 7.90 through 7.91. The increased lifetime cancer risks from radionuclides in surface water based on RME results for the future on-site resident adults, and young children are $1x10^{-6}$ and $2x10^{-6}$ respectively.

6.3.3 Ingestion of Surface Soil

Incidental ingestion of soil can expose future on-site residents to contaminants present in soil. Construction workers may also come into contact with radionuclides in contaminated soil during intrusive activities. The annual radiation dose from soil for future on-site residents and future construction workers are summarized in Appendix D, Table 7.95 to 7.102. Dermal uptake of radionuclides from soil does not represent a significant exposure pathway because of the low permeability of radionuclides through the skin barrier. The annual radiological dose ranges from 0.1 to 7 mrem/yr. The potential RME annual doses for the surface soil future on-site resident adults, young children, and construction workers are 0.9, 3.4 and 1.9 mrem/yr, respectively. The increased lifetime cancer risk from these radionuclides in surface soil for these potential receptors is provided in Tables 7.95 through 7.97. The ILCR from radionuclides in surface soil based on RME exposure factors for future on-site resident adults, young children and construction workers are $9x10^{-6}$, $6x10^{-5}$ and $8x10^{-7}$, respectively.

The potential radiation exposure was estimated for other receptors who may come in contact with the surface soil through incidental contact during normal work tasks. These receptors included the construction worker, an industrial worker, a trespasser, recreational residents and a farmer. These exposure scenarios are provided in Chapter 2 of this report. As shown in Table 7.97, the industrial worker was estimated to receive 0.6 mrem/yr or a potential risk of $7x10^{-6}$. As shown in Table 7.99 and 7.100, the recreational resident (adult and child) was estimated to receive from 0.5 mrem/yr to 2 mrem/yr. The corresponding ILCR was estimated to be $3x10^{-5}$. As shown in Table 7.101, the trespasser was estimated to receive less than 0.1 mrem/yr or a corresponding ILCR of $6x10^{-7}$. As shown in Table 7.102, the farmer was estimated to receive 1 mrem/yr or a corresponding ILCR of $1x10^{-5}$.

6.3.4 External Radiation

The radioactive constituents in the surface soil may present a potential exposure from external radiation to receptors that reside or work at the site. The radiation dose and risk assessments for external radiation were calculated using the RESRAD program, with the summary reports presented in Appendix F. The annual external radiation exposure ranges from 170 to 180 mrem/yr. Exposures were estimated for the future on-site residents, and future construction

workers. The potential RME results from direct radiation for the surface soil for future on-site residents (adults and young children) and construction worker are 170, 180 and 9 mrem/yr, respectively. The increased lifetime cancer risk from this pathway is provided in Table 7.1 for the reasonable maximum exposed individuals. The ILCR external radiation based on RME exposure factors for the future on-site residents (adult and young child) and a construction worker are $2x10^{-3}$, $8x10^{-4}$, and $2x10^{-4}$, respectively.

6.3.5 Inhalation of Airborne Dust and Particulates

The radiological contaminants in the surface soil may be inhaled as airborne particulates. The dose and risk assessments for inhalation were calculated using the RESRAD program, with summary reports presented in Appendix F. The inhalation pathway represents a minimal airborne exposure potential. The annual radiological dose ranges from 0.6 to 6 mrem/yr. Exposures were estimated for the future on-site residents, and future construction workers. The potential RME results for the surface soil for future on-site resident adults, young children, and construction worker are 6, 3, and 0.6 mrem/yr, respectively. The increased lifetime cancer risk from radionuclides in surface soil for these potential receptors is shown in Tables 7.1 for the future on-site resident adults, young children and construction workers are $8x10^{-6}$, $1x10^{-6}$ and $2x10^{-7}$, respectively.

6.3.6 Subsurface Soil

Construction workers may come into contact with residual radioactivity in soil during intrusive activities at the facility. The workers may ingest the soil during the normal performance of their work assignments. The worker is dermally exposed to surface soil, subsurface soil to fifteen feet below ground surface and groundwater in the overburden. Dermal exposure to media is limited to the face, hands, and forearms. The worker incidentally ingests surface soil and subsurface soil from contact with these media. The annual radiation dose for future construction workers, summarized in Table 7.103, is estimated to be 7 mrem/yr. The ILCR from radionuclides in subsurface soil for the construction worker is $9x10^{-7}$.

6.4 Total Cancer Risks and Health Hazards

To establish the RME, the non-radiological risks were summed across the completed pathway for each receptor. Table 8.1 presents this information, and the sections below explain the total cancer risks and health hazards for each receptor group further.

6.4.1 Resident

Total risks were calculated for the resident child, resident adult, and the composite adult. The composite adult describes a 30-year risk for a resident starting from birth to 30 years of age. The total cancer risks for the resident child and adult are in the order of 10^{-1}. The total cancer risk for the composite adult is above 10^{0} over a 30-year period. These total cancer risks exceed the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQs for the resident child, adult, and composite adult exceed unity by three orders of magnitude. The majority of the risk is associated with ingestion of tap water, dermal contact of tap water, and indoor inhalation of vapors.[19] The risk associated with the ingestion of groundwater from the overburden was not included in the summation of risk. The hydraulic conductivity of the overburden is too low to provide an adequate supply of water. The quality of the water is poor and not potable.

6.4.2 Commercial/Industrial Worker

The total cancer risk calculated for an adult commercial/industrial worker is in the order of 10^{-2}. This total cancer risk exceeds the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQ for this receptor exceeds unity by two orders of magnitude. The majority of the risk is associated with ingestion of tap water, dermal contact of tap water, and indoor inhalation of vapors. The risk associated with the ingestion of groundwater from the overburden was not included in the summation of risk.

6.4.3 Construction Worker

The total cancer risk calculated for an adult construction worker is in the order of 10^{-5}. This total cancer risk is within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQ for this receptor exceeds unity by less than one order of magnitude. The majority of the risk is associated with dermal contact with overburden groundwater.

6.4.4 Recreational

Total risks were calculated for the recreational child, recreational adult, and the recreational composite adult. The composite adult describes a 30-year risk for a recreational individual starting from birth to 30 years of age. The total cancer risks for the recreational child and adult are in the order of 10^{-6}, respectively. The total cancer risk for the recreational composite adult is on the order of 10^{-5}. These total cancer risks are within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQs for the recreational child, adult, and composite adult are below unity by one to two orders of magnitude.

[19] The risk for this scenario is the addition of whole body during bathing and hands during hand washing.

6.4.5 Visitor/Trespasser

The total cancer risk calculated for a child visitor/trespasser is in the order of 10^{-7}. The total cancer risk calculated for an adult visitor/trespasser is in the order of 10^{-6}. The total cancer risk calculated for a composite adult is in the order of 10^{-6}. This total cancer risk is within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQ for this receptor is below unity by two orders of magnitude.

6.4.6 Agricultural Worker

The total cancer risk calculated for an adult agricultural worker is in the order of 10^{-4}. This total cancer risk is within the acceptable range of 10^{-6} to 10^{-4} for ILCR. The HQ for this receptor is below unity by one order of magnitude.

6.5 Uncertainty

Uncertainties in the risk assessment are discussed in this section. Uncertainties may be present in the identification of COPCs, may be associated with the exposure assessment and the toxicity assessment, or may be a result of the risk characterization. In a human health risk assessment, uncertainty relates to both the variability of the available data and to the absence of a value for a parameter of interest (e.g., exposure point concentration, exposure factors).

6.5.1 Analytical Data

With regard to analytical data, for example, uncertainty can exist in data collection, data analysis and validation, statistical analysis of the data, and screening of the data. Samples were collected from known and suspected areas of contamination (i.e., “biased sampling”), to delineate the nature and extent of contamination. Although this sampling methodology provided a reasonable estimation of the level of contamination at known or suspected contaminated areas, the possibility exists that the data sets formed by these samples do not accurately represent the level of contamination and instead overestimate the concentrations to which receptors are potentially exposed.

Blank contamination was another source of potential uncertainty with regard to laboratory analysis. Blank contamination can occur during sample collection, sample preparation, or sample analysis, and may result in false positive results in the database. To eliminate this possibility, contaminants detected in samples at concentrations less than five times the concentration detected in the associated blank were treated as non-detects. Common laboratory contaminants (acetone, 2-butanone, and methylene chloride) detected in samples at concentrations less than ten times the concentration detected in the associated blank were also treated as nondetects. This reduced the likelihood of false positive results affecting the

quantitative risk assessment; however, it may have eliminated some low-level positive detections in the database.

The analysis of radionuclides provided an estimate of counting error associated with the decay of the radioactive isotope. For the purposes of this assessment, the counting error was not used to modify the statistical analysis of the data. The 95% UCL was calculated for both the radioactive and chemical COPCs; an estimate of the distribution of the specific dataset was made to eliminate some of the uncertainty of the mean or mode of the data.

6.5.2 Exposure Point Concentrations

The statistical analysis of the data introduced some additional uncertainty. Statistical analysis showed that the data exhibited wide ranges of values and variability for certain COPCs. The large variability may be the result of combining samples collected from known areas of contamination (biased samples) and samples collected randomly. While combining samples provides a more accurate representation of the site-wide contamination than either sampling scheme by itself, combining sample types does introduce a high degree of variability into the data set. The exposure point concentrations used in the exposure assessment for the RME receptors are based on 95 percent UCLs of the mean. These UCL values provide a conservative estimate of the true average concentration, and, therefore, they tend to overestimate the potential exposure.

6.5.3 Exposure Factors

Uncertainties related to the conservative aspect of the risk analysis process and methodologies are especially apparent in the exposure assessment. The USEPA model for conducting human health risk assessments presently requires the use of point estimates for all parameters (e.g., chemical concentration, body weight, length of residence) to establish risk estimates for exposure scenarios. Single-point estimates, however, do not demonstrate the similarity or variability of the data. Therefore, uncertainty analysis is limited to qualitative statements about the confidence placed in critical data or default input parameters used in the exposure assessment used to establish the baseline human health risk assessment.

USEPA default values for many of the RME parameters, such as those for ingestion rates of environmental media, exposure duration, and frequency of events, tends to overestimate exposure in the current and future land-use scenarios. Consequently, the use of these default values provides a conservative result.

In exposure pathways that estimate uptake by ingestion, it was assumed that 100 percent of the ingested COPCs were absorbed. This assumption may be valid for organic, lipophilic COPCs, but this assumption overestimates intake of most inorganic COPCs. Thus, for metals, the fraction of inorganic constituents actually absorbed by ingestion is likely to be overestimated in the CDI dose rate uptake of COPCs in all environmental media. As demonstrated in many animal studies and in limited human studies measuring bioavailability of metals after ingestion, less than 10 percent of most metals, even in soluble form, are absorbed from the alimentary tract into the body. This one assumption may overestimate ingested metals intake in all media by an order of magnitude.

Dermal uptake of COPCs by direct dermal contact to soil, sediment, or water is an exposure pathway with inherent uncertainty. Dermal uptake is directly proportional to the length of time for each exposure event. While dermal absorption coefficients for estimating absorbed doses from direct skin contact with water are available or can be calculated (USEPA 2001), some constituents, such as dissolved metals, are generally poorly absorbed through skin contact and use of calculated values for metals and certain other COPCs that are based on dermal absorption of water significantly overestimate exposures via this pathway.

Dermal uptake from soil/sediment is even more uncertain. Quantitative exposure assessment of COPCs in soil/sediment by direct dermal contact is limited to the constituents for which absorption factors were available. Dermal uptake of other COPCs is underestimated in these dermal exposure pathways. However, uptake of metals by dermal exposure to soil/sediment is considered a minor contributing pathway to the total estimated dosage of metals in impacted media. Transfer of metals from soil to skin as an absorbed dose appears to be on the order of 0.1 to 1.0 percent of the available dose in soil (USEPA 2004b).

6.5.5 Uncertainties in Toxicity Assessment

Toxicity assessment relies upon the use of toxicity values (carcinogenic SF, non-carcinogenic RfDs, or RfCs) developed by USEPA to evaluate potential chronic toxicity of COPCs. These toxicity values may be estimated from human data, but the process is largely dependent upon laboratory animal data generated from a variety of toxicology and safety testing studies conducted on constituents.

Toxicity values are not available for all COPCs. Therefore, health risks/hazards cannot be quantitatively assessed for all constituents, and the total risk/hazard for the Site may be underestimated in such circumstances. The carcinogen toxicity values, SFs, are derived from cancer bioassay or epidemiologic dose-response data to estimate carcinogenic risk at constituent

concentrations that may be several orders of magnitude lower that the given dose or estimated exposure observed in the studies that form the basis of the assessment. Thus, extrapolations are made in projecting potential effects at low doses from data on effects at high doses; all these extrapolations add to the uncertainty. A number of uncertainties are associated with this methodology.

The extrapolation of observed carcinogenic effects at high doses used in animal cancer studies to possible cancer effects at substantially lower doses is based on the hypothesis that there is no threshold dose for carcinogens. The extrapolation of carcinogenic and non-carcinogenic effects in animals to effects in humans may not be appropriate for all constituents.

While USEPA recommends standard weight-of-evidence descriptors for carcinogens, the cancer risk algorithm does not utilize this weight-of-evidence and sums all carcinogenic risks equally, whether a COPC is a known human carcinogen or only a suspect carcinogen. Each of these three uncertainty factors tends to overestimate cancer risk. There are also questions concerning the summation of cancer risks when different constituents have specific target organs or induce quite different neoplastic disease states.

The toxicological information for trichloroethylene (TCE) is under review. USEPA recommends using the upper end of the slope factor range for susceptible populations having risk factors for TCE-induced cancer. The upper-end slope factor was used in this risk assessment to assure that risk to susceptible individuals is not underestimated. However, risks to the general exposed population may be overestimated.

Toxicity values derived to estimate chronic dosages that may induce non-cancer adverse effects also have a number of limitations. Unlike cancer risk assessment, by convention non-cancer adverse effects are assumed to occur in a dose-response manner only after a threshold dose has been exceeded. This assumption is the basis for the use of the RfD or RfC in estimating the HI. If this ratio is greater than 1.0, such exposures may be considered hazardous. The HI can only be used to qualitatively rank the possibility of adverse non-cancer effects occurring. The HI used to describe non-cancer health hazards has an inherent uncertainty. For example, RfDs are derived from NOAEL or LOAEL dose rates determined from animal studies or human exposure investigations. Depending on the quality of the available data, the NOAEL or LOAEL is divided by an uncertainty factor ranging from 1 to 10,000. Large uncertainty factors used in extrapolating animal effects to human effects may over-estimate non-cancer hazards.

The HI approach assumes that all non-cancer adverse effects to the same organ or systems are additive. While this approach may be sound for assessing a series of constituents that have

similar modes of action and act on the same target organ, it may not be appropriate when there are different modes of action. Summation of HIs to calculate a total HI for an exposure scenario can generate a very large number. The HI is a ratio of estimated exposure compared to a "safe" exposure dose. A health hazard is indicated if this ratio exceeds one. The magnitude of a calculated HI greater than one has little bearing on the potential severity of adverse effects.

A number of factors contributed to uncertainties in this risk characterization. These uncertainties are attributable to the risk characterization procedure itself and to several site-specific factors. Quantitative risk characterization is largely dependent upon laboratory-derived animal toxicity values (carcinogenic slope factors, non-carcinogenic RfDs, and RfCs) for the constituents of potential concern. Toxicity values are not available for all COPCs; therefore, risks/hazards cannot be quantitatively characterized for these constituents and the total calculated risk/hazard for the site may be underestimated. Additionally, toxicity values derived from animal studies are given the same weight as toxicity values derived from human data.

COPCs with different carcinogenic weights of evidence are summed in this risk characterization. The carcinogenic risk equation for multiple substances sums all carcinogens equally, giving as much weight to Group B1 or B2 carcinogens as to Group A carcinogens. This tends to overestimate calculated carcinogenic risks.

7.0 References

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8.0 Tables

Table 1.1 Selection of Exposure Pathways -- Current

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Groundwater	Groundwater	Tap Water/Shower	Resident	Adult/Child	Dermal	**Complete**	An on-site resident uses groundwater for domestic use.
		Outdoors			Dermal	Incomplete	Resident is not expected to come into contact with groundwater that is not obtained from a well.
		Tap Water			Ingestion	**Complete**	An on-site resident uses groundwater for domestic use.
	Indoor Air	Showerhead			Inhalation	**Complete**	An on-site resident uses groundwater for domestic use.
		Foundation Cracks			Inhalation	Incomplete	Groundwater impacts are at a great depth and not expected to reach building foundations.
	Outdoor Air	Outdoors			Inhalation	Incomplete	Groundwater impacts are at a great depth and not expected to reach the ground surface.
	Groundwater	Tap Water/ Shower	Construction Worker	Adult	Dermal	Incomplete	Construction work is limited to outdoor activities.
		Outdoors			Dermal	**Complete**	Construction worker may come in contact with impacted groundwater during excavation activities.
		Tap Water			Ingestion	Incomplete	Construction work evaluation is limited to construction activities.
	Indoor Air	Showerhead			Inhalation	Incomplete	Construction work evaluation is limited to construction activities.
		Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to construction activities. Construction workers not expected to perform work inside buildings.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Construction worker may be exposed to volatile chemicals from groundwater during excavation activities to depth of construction.
	Groundwater	Tap Water/ Shower	Commercial/ Industrial	Adult	Dermal	Incomplete	Water is currently treated before use.
		Outdoors			Dermal	Incomplete	Commercial worker is not expected to come into contact with groundwater that is not obtained from a well.
		Tap Water			Ingestion	Incomplete	Water is currently treated before use. Site is currently in the process of being connected to the municipal water system.
	Indoor Air	Showerhead			Inhalation	Incomplete	Commercial workers are not expected to shower at their place of employment.
		Foundation Cracks			Inhalation	**Complete**	Commercial workers are expected to conduct indoor activities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Commercial workers are expected to conduct outdoor activities.
	Groundwater	Tap Water/Shower	Recreational	Adult/Child	Dermal	Incomplete	Recreational use is not currently allowed on the Site.
		Outdoors			Dermal	Incomplete	Recreational use is not currently allowed on the Site.
		Tap Water			Ingestion	Incomplete	Recreational use is not currently allowed on the Site.
	Indoor Air	Showerhead			Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
		Foundation Cracks			Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Outdoor Air	Outdoors			Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Groundwater	Tap Water/ Shower	Visitor/Trespasser	Adult	Dermal	Incomplete	Trespasser is not expected to have access to indoor facilities.
		Outdoors			Dermal	Incomplete	Trespasser is not expected to have access to groundwater.
		Tap Water			Ingestion	Incomplete	Trespasser is not expected to have access to groundwater.
	Indoor Air	Showerhead			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
		Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Trespasser is expected to be exposed to outdoor air.
	Groundwater	Tap Water/ Shower	Agricultural Worker	Adult	Dermal	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
		Outdoors			Dermal	Incomplete	Agricultural worker is not expected to come into contact with groundwater.
		Tap Water			Ingestion	Incomplete	Agricultural worker is not expected to come into contact with groundwater.
	Indoor Air	Showerhead			Inhalation	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
		Foundation Cracks			Inhalation	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.

Table 1.1 Selection of Exposure Pathways -- Current

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Resident	Adult/Child	Dermal	**Complete**	Receptor may enter streams or ponds.
					Ingestion	**Complete**	Receptor may enter streams or ponds.
	Outdoor Air				Inhalation	**Complete**	Receptor may enter streams or ponds.
	Surface Water/Sediment	Stream or Pond	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with surface water/sediment during construction related activities.
					Ingestion	**Complete**	Construction worker may come in contact with surface water/sediment during construction related activities.
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with surface water/sediment during construction related activities.
	Surface Water/Sediment	Stream or Pond	Commercial/ Industrial	Adult	Dermal	**Complete**	Receptor may conduct outdoor activities.
					Ingestion	**Complete**	Receptor may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Receptor may conduct outdoor activities.
	Surface Water/Sediment	Stream or Pond	Recreational	Adult/Child	Dermal	Incomplete	Recreational use is not currently allowed on the Site.
					Ingestion	Incomplete	Recreational use is not currently allowed on the Site.
	Outdoor Air				Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Surface Water/Sediment	Stream or Pond	Visitor/Trespasser	Adult	Dermal	**Complete**	Trespasser may enter streams or ponds.
					Ingestion	**Complete**	Trespasser may enter streams or ponds.
	Outdoor Air				Inhalation	**Complete**	Trespasser may enter streams or ponds.
	Surface Water/Sediment	Stream or Pond	Agricultural Worker	Adult	Dermal	**Complete**	Receptor may conduct outdoor activities.
					Ingestion	**Complete**	Receptor may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Receptor may conduct outdoor activities.

Table 1.1 Selection of Exposure Pathways -- Current

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Surface Soil	Surface Soil	Outdoors	Resident	Adult/Child	Dermal	**Complete**	Resident may come into contact with surface soil during outdoor activities.
					Ingestion	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Particulates				Inhalation	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Current residence is not built on impacted soil.
	Surface Soil	Outdoors	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
					Ingestion	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Particulates				Inhalation	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to outdoor construction activities.
	Surface Soil	Outdoors	Commercial/ Industrial	Adult	Dermal	**Complete**	Commercial worker may conduct outdoor activities.
					Ingestion	**Complete**	Commercial worker may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Particulate				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Site buildings are on top of contaminated surface soils.
	Surface Soil	Outdoors	Recreational	Adult/Child	Dermal	Incomplete	Recreational use is not currently allowed on the Site.
					Ingestion	Incomplete	Recreational use is not currently allowed on the Site.
	Outdoor Air				Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Particulates				Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Surface Soil	Outdoors	Visitor/Trespasser	Adult	Dermal	**Complete**	Trespasser may have contact with surface soil.
					Ingestion	**Complete**	Trespasser may have contact with surface soil.
	Outdoor Air				Inhalation	**Complete**	Trespasser may have contact with surface soil.
	Particulates				Inhalation	**Complete**	Trespasser may have contact with surface soil.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Surface Soil	Outdoors	Agricultural Worker	Adult	Dermal	**Complete**	Agricultural worker is expected to come into contact with surface soils during farming activities.
					Ingestion	**Complete**	Agricultural worker is expected to come into contact with surface soils during farming activities.
	Outdoor Air				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Particulates				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Agricultural worker is not expected to perform indoor activities.

Table 1.1 Selection of Exposure Pathways -- Current

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Subsurface Soil	Subsurface Soil	Outdoors	Resident	Adult/Child	Dermal	Incomplete	Resident is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Resident is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Resident may conduct outdoor activities.
	Particulates				Inhalation	Incomplete	Resident is not expected to come into contact with subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Current residence is not built on impacted soil.
	Subsurface Soil	Outdoors	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
					Ingestion	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Particulates				Inhalation	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to outdoor construction activities.
	Subsurface Soil	Outdoors	Commercial/ Industrial	Adult	Dermal	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Particulates				Inhalation	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Site buildings are on top of contaminated subsurface soils.
	Subsurface Soil	Outdoors	Recreational	Adult/Child	Dermal	Incomplete	Recreational use is not currently allowed on the Site.
					Ingestion	Incomplete	Recreational use is not currently allowed on the Site.
	Outdoor Air				Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Particulates				Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Recreational use is not currently allowed on the Site.
	Subsurface Soil	Outdoors	Visitor/Trespasser	Adult	Dermal	Incomplete	Trespasser is not expected to have access to subsurface soils.
					Ingestion	Incomplete	Trespasser is not expected to have access to subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Trespasser may conduct outdoor activities
	Particulates				Inhalation	Incomplete	Trespasser is not expected to have access to subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Subsurface Soil	Outdoors	Agricultural Worker	Adult	Dermal	Incomplete	Agricultural worker is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Agricultural worker is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Particulates				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Agricultural worker is not expected to conduct indoor activities.

Table 1.2 Selection of Exposure Pathways -- Future

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Groundwater	Groundwater	Tap Water/Shower	Resident	Adult/Child	Dermal	**Complete**	Resident is expected to use groundwater for domestic use.
		On Site			Dermal	Incomplete	Resident is not expected to come into contact with groundwater that is not obtained from a well.
		Tap Water			Ingestion	**Complete**	Resident is expected to use groundwater for domestic use.
	Indoor Air	Showerhead			Inhalation	**Complete**	Resident is expected to use groundwater for domestic use.
		Foundation Cracks			Inhalation	**Complete**	Pathway is complete when residential structures are built on top of areas with shallow groundwater contamination.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Resident is expected to conduct outdoor activities.
	Groundwater	Tap Water/ Shower	Construction Worker	Adult	Dermal	Incomplete	Construction work is limited to outdoor activities.
		Outdoors			Dermal	**Complete**	Construction worker may come in contact with impacted groundwater during excavation activities.
		Tap Water			Ingestion	Incomplete	Construction work evaluation is limited to construction activities.
	Indoor Air	Showerhead			Inhalation	Incomplete	Construction work evaluation is limited to construction activities.
		Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to construction activities. Construction workers not expected to perform work inside buildings.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Construction worker may be exposed to volatile chemicals from groundwater during excavation activities to depth of construction.
	Groundwater	Tap Water/ Shower	Commercial/ Industrial	Adult	Dermal	**Complete**	Groundwater is impacted in aquifers that are a source of domestic water.
		Outdoors			Dermal	Incomplete	Commercial worker is not expected to come into contact with groundwater that is obtained from a well.
		Tap Water			Ingestion	**Complete**	Groundwater is impacted in aquifers that are a source of domestic water.
	Indoor Air	Showerhead			Inhalation	Incomplete	Commercial workers are not expected to shower at their place of employment.
		Foundation Cracks			Inhalation	**Complete**	Pathway is complete when commercial structures are built on top of areas with shallow groundwater contamination.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Groundwater	Tap Water/Shower	Recreational	Adult/Child	Dermal	Incomplete	Recreational use evaluation is limited to recreational activities, and does not include indoor activities.
		Outdoors			Dermal	Incomplete	Recreational user is not expected to have access to groundwater.
		Tap Water			Ingestion	Incomplete	Recreational user is not expected to have access to groundwater.
	Indoor Air	Showerhead			Inhalation	Incomplete	Recreational user is not expected to have access to groundwater.
		Foundation Cracks			Inhalation	Incomplete	Recreational use evaluation is limited to recreational activities, and does not include indoor activities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Recreational user is expected to be exposed to outdoor air.
	Groundwater	Tap Water/ Shower	Visitor/Trespasser	Adult	Dermal	Incomplete	Trespasser is not expected to have access to indoor facilities.
		Outdoors			Dermal	Incomplete	Trespasser is not expected to have access to groundwater.
		Tap Water			Ingestion	Incomplete	Trespasser is not expected to have access to groundwater.
	Indoor Air	Showerhead			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
		Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Trespasser is expected to be exposed to outdoor air.
	Groundwater	Tap Water/ Shower	Agricultural Worker	Adult	Dermal	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
		Outdoors			Dermal	Incomplete	Agricultural worker is not expected to come into contact with groundwater.
		Tap Water			Ingestion	Incomplete	Agricultural worker is not expected to come into contact with groundwater.
	Indoor Air	Showerhead			Inhalation	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
		Foundation Cracks			Inhalation	Incomplete	Evaluation of agricultural worker considers only farming activities. Agricultural worker is not expected to perform indoor activities.
	Outdoor Air	Outdoors			Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.

Table 1.2 Selection of Exposure Pathways -- Future

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Resident	Adult/Child	Dermal	**Complete**	Receptor may enter streams or ponds.
					Ingestion	**Complete**	Receptor may enter streams or ponds.
	Outdoor Air				Inhalation	**Complete**	Receptor may enter streams or ponds.
	Surface Water/Sediment	Stream or Pond	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with surface water during construction related activities.
					Ingestion	**Complete**	Construction worker may come in contact with surface water during construction related activities.
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with surface water during construction related activities.
	Surface Water/Sediment	Stream or Pond	Commercial/ Industrial	Adult	Dermal	**Complete**	Receptor may conduct outdoor activities.
					Ingestion	**Complete**	Receptor may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Receptor may conduct outdoor activities.
	Surface Water/Sediment	Stream or Pond	Recreational	Adult/Child	Dermal	**Complete**	Receptor may enter streams or ponds.
					Ingestion	**Complete**	Receptor may enter streams or ponds.
	Outdoor Air				Inhalation	**Complete**	Receptor may enter streams or ponds.
	Surface Water/Sediment	Stream or Pond	Visitor/Trespasser	Adult	Dermal	**Complete**	Receptor may enter streams or ponds.
					Ingestion	**Complete**	Receptor may enter streams or ponds.
	Outdoor Air				Inhalation	**Complete**	Receptor may enter streams or ponds.
	Surface Water/Sediment	Stream or Pond	Agricultural Worker	Adult	Dermal	**Complete**	Receptor may conduct outdoor activities.
					Ingestion	**Complete**	Receptor may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Receptor may conduct outdoor activities.

Table 1.2 Selection of Exposure Pathways -- Future

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Surface Soil	Surface Soil	Outdoors	Resident	Adult/Child	Dermal	**Complete**	Resident may come into contact with surface soil during outdoor activities.
					Ingestion	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Particulate				Inhalation	**Complete**	Resident may come into contact with surface soil during outdoor activities.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Pathway is complete when residential structures are built on top of areas with surface soil contamination.
	Surface Soil	Outdoors	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
					Ingestion	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Particulates				Inhalation	**Complete**	Construction worker may come in contact with surface soils during construction related activities.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to outdoor construction activities.
	Surface Soil	Outdoors	Commercial/ Industrial	Adult	Dermal	**Complete**	Commercial worker may conduct outdoor activities.
					Ingestion	**Complete**	Commercial worker may conduct outdoor activities.
	Outdoor Air				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Particulate				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Pathway is complete when commercial structures are built on top of areas with surface soil contamination.
	Surface Soil	Outdoors	Recreational	Adult/Child	Dermal	**Complete**	Recreational user is expected to come into contact with surface soils during recreational activities.
					Ingestion	**Complete**	Recreational user is expected to come into contact with surface soils during recreational activities.
	Outdoor Air				Inhalation	**Complete**	Recreational user is expected to come into contact with surface soils during recreational activities.
	Particulates				Inhalation	**Complete**	Recreational user is expected to come into contact with surface soils during recreational activities.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Recreational user is not expected to perform indoor activities.
	Surface Soil	Outdoors	Visitor/Trespasser	Adult	Dermal	**Complete**	Trespasser may have contact with surface soil.
					Ingestion	**Complete**	Trespasser may have contact with surface soil.
	Outdoor Air				Inhalation	**Complete**	Trespasser may have contact with surface soil.
	Particulates				Inhalation	**Complete**	Trespasser may have contact with surface soil.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Surface Soil	Outdoors	Agricultural Worker	Adult	Dermal	**Complete**	Agricultural worker is expected to come into contact with surface soils during farming activities.
					Ingestion	**Complete**	Agricultural worker is expected to come into contact with surface soils during farming activities.
	Outdoor Air				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Particulates				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Agricultural worker is not expected to perform indoor activities.

Table 1.2 Selection of Exposure Pathways -- Future

Westinghouse Electric Co. Hematite Site

Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Complete/Incomplete	Rationale for Selection or Exclusion of Exposure Pathway
Subsurface Soil	Subsurface Soil	Outdoors	Resident	Adult/Child	Dermal	Incomplete	Resident is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Resident is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Resident may conduct outdoor activities.
	Particulates				Inhalation	Incomplete	Resident is not expected to come into contact with subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Pathway is complete when residential structures are built on top of areas with subsurface soil contamination.
	Subsurface Soil	Outdoors	Construction Worker	Adult	Dermal	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
					Ingestion	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Outdoor Air				Inhalation	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Particulates				Inhalation	**Complete**	Construction worker may come in contact with subsurface soils during construction related activities. (Evaluated only to depth of construction.)
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Construction work evaluation is limited to outdoor construction activities.
	Subsurface Soil	Outdoors	Commercial/ Industrial	Adult	Dermal	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Commercial worker may conduct outdoor activities.
	Particulates				Inhalation	Incomplete	Commercial worker is not expected to come into contact with subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	**Complete**	Pathway is complete when commercial structures are built on top of areas with subsurface soil contamination.
	Subsurface Soil	Outdoors	Recreational	Adult/Child	Dermal	Incomplete	Recreational user is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Recreational user is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Recreational user is expected to be exposed to outdoor air.
	Particulates				Inhalation	Incomplete	Recreational user is not expected to come into contact with subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Recreational user is not expected to perform indoor activities.
	Subsurface Soil	Outdoors	Visitor/Trespasser	Adult	Dermal	Incomplete	Trespasser is not expected to have access to subsurface soils.
					Ingestion	Incomplete	Trespasser is not expected to have access to subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Visitor/trespasser user is expected to be exposed to outdoor air.
	Particulates				Inhalation	Incomplete	Trespasser is not expected to have access to subsurface soils.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Trespasser is not expected to have access to indoor facilities.
	Subsurface Soil	Outdoors	Agricultural Worker	Adult	Dermal	Incomplete	Agricultural worker is not expected to come into contact with subsurface soils.
					Ingestion	Incomplete	Agricultural worker is not expected to come into contact with subsurface soils.
	Outdoor Air				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Particulates				Inhalation	**Complete**	Agricultural worker is expected to come into contact with outdoor air.
	Indoor Air	Foundation Cracks			Inhalation	Incomplete	Agricultural worker is not expected to conduct indoor activities.

TABLE 1.3 SELECTION OF SAMPLE POINTS FOR EXPOSURE PATHWAYS
Westinghouse Electric Co. Hematite Site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Sample Points	EPC Set#
Current/Future	Groundwater	Groundwater	Tap Water/Shower	Resident	Child/Adult	Dermal	Overburden wells	1
Current/Future		Groundwater	Tap Water	Resident	Child/Adult	Ingestion		
Current/Future		Indoor Air - Vapors	Showerhead	Resident	Child/Adult	Inhalation		
Current/Future		Indoor Air - Vapors	Foundation Cracks	Resident	Child/Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Resident	Child/Adult	Inhalation		
Current/Future		Groundwater	Tap Water/Shower	Com. & Ind. Worker	Adult	Dermal		
Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Adult	Ingestion		
Current/Future		Indoor Air - Vapors	Foundation Cracks	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Adult	Inhalation		
Current/Future		Groundwater	Outdoors	Construction Worker	Adult	Dermal		
Future		Outdoor Air - Vapors	Outdoors	Recreational	Child/Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Adult	Inhalation		
Current/Future	Groundwater	Groundwater	Tap Water/Shower	Resident	Child/Adult	Dermal	Bedrock wells	2
Current/Future		Groundwater	Tap Water	Resident	Child/Adult	Ingestion		
Current/Future		Indoor Air - Vapors	Showerhead	Resident	Child/Adult	Inhalation		
Current/Future		Groundwater	Tap Water/Shower	Com. & Ind. Worker	Adult	Dermal		
Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Adult	Ingestion		
Current/Future	Surface Water/ Sediment	Surface Water/Sediment	Stream or Pond	Resident	Child/Adult	Dermal	Surface water	3
Current/Future		Surface Water/Sediment	Stream or Pond	Resident	Child/Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Stream or Pond	Resident	Child/Adult	Inhalation		
Current/Future		Surface Water/Sediment	Stream or Pond	Com. & Ind. Worker	Adult	Dermal		
Current/Future		Surface Water/Sediment	Stream or Pond	Com. & Ind. Worker	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Stream or Pond	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Surface Water/Sediment	Stream or Pond	Construction Worker	Adult	Dermal		
Current/Future		Surface Water/Sediment	Stream or Pond	Construction Worker	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Stream or Pond	Construction Worker	Adult	Inhalation		
Future		Surface Water/Sediment	Stream or Pond	Recreational	Child/Adult	Dermal		
Future		Surface Water/Sediment	Stream or Pond	Recreational	Child/Adult	Ingestion		
Future		Outdoor Air - Vapors	Stream or Pond	Recreational	Child/Adult	Inhalation		
Current/Future		Surface Water/Sediment	Stream or Pond	Visitor/Trespasser	Adult	Dermal		
Current/Future		Surface Water/Sediment	Stream or Pond	Visitor/Trespasser	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Stream or Pond	Visitor/Trespasser	Adult	Inhalation		
Future		Surface Water/Sediment	Stream or Pond	Agricultural Worker	Adult	Dermal		
Future		Surface Water/Sediment	Stream or Pond	Agricultural Worker	Adult	Ingestion		
Future		Outdoor Air - Vapors	Stream or Pond	Agricultural Worker	Adult	Inhalation		

TABLE 1.3 SELECTION OF SAMPLE POINTS FOR EXPOSURE PATHWAYS
Westinghouse Electric Co. Hematite Site

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Sample Points	EPC Set#
Current/Future	Surface Soil	Surface Soil	Outdoors	Resident	Child/Adult	Dermal	Surface soil	4
Current/Future		Surface Soil	Outdoors	Resident	Child/Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Outdoors	Resident	Child/Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Resident	Child/Adult	Inhalation		
Current/Future		Indoor Air - Vapors	Foundation Cracks	Resident	Child/Adult	Inhalation		
Current/Future		Surface Soil	Outdoors	Com. & Ind. Worker	Adult	Dermal		
Current/Future		Surface Soil	Outdoors	Com. & Ind. Worker	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Indoor Air - Vapors	Foundation Cracks	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Surface Soil	Outdoors	Construction Worker	Adult	Dermal		
Current/Future		Surface Soil	Outdoors	Construction Worker	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Construction Worker	Adult	Inhalation		
Future		Surface Soil	Outdoors	Recreational	Child/Adult	Dermal		
Future		Surface Soil	Outdoors	Recreational	Child/Adult	Ingestion		
Future		Outdoor Air - Vapors	Outdoors	Recreational	Child/Adult	Inhalation		
Future		Outdoor Air - Particulates	Outdoors	Recreational	Child/Adult	Inhalation		
Current/Future		Surface Soil	Outdoors	Visitor/Trespasser	Adult	Dermal		
Current/Future		Surface Soil	Outdoors	Visitor/Trespasser	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Visitor/Trespasser	Adult	Inhalation		
Current/Future		Surface Soil	Outdoors	Agricultural Worker	Adult	Dermal		
Current/Future		Surface Soil	Outdoors	Agricultural Worker	Adult	Ingestion		
Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Agricultural Worker	Adult	Inhalation		
Current/Future	Subsurface Soil	Indoor Air - Vapors	Foundation Cracks	Resident	Child/Adult	Inhalation	Subsurface soil	5
Future		Outdoor Air - Vapors	Outdoors	Resident	Child/Adult	Inhalation		
Current/Future		Indoor Air - Vapors	Foundation Cracks	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Construction Worker	Adult	Inhalation		
Future		Outdoor Air - Vapors	Outdoors	Recreational	Child/Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Adult	Inhalation		
Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Adult	Inhalation		
Current/Future		Outdoor Air - Particulates	Outdoors	Agricultural Worker	Adult	Inhalation		
Current/Future	Subsurface Soil	Subsurface Soil	Outdoors	Construction Worker	Adult	Dermal	Subsurface soil samples to depth of 15 feet	6
Current/Future		Subsurface Soil	Outdoors	Construction Worker	Adult	Ingestion		

TABLE 1.4 SPECIFIC SAMPLING POINTS FOR CALCULATION OF EXPOSURE POINT CONCENTRATIONS
Westinghouse Electric Co. Hematite Site

1	2	3	4	5	6
Overburden wells	Bedrock wells	Surface water	Surface soil	Subsurface soil	Subsurface soil samples to depth of 15 feet
BP-21-25-35-OL-GW-SS	BW-BR10-32-39-GW-SS	SW-01-SW	BD-09-00-SL	BD-13-09-SL	BD-13-09-SL
BW-BR3-24-34-GW-SS	BW-BR11-69-109-GW-SS	SW-02-SW	BD-10-00-SL	BD-13-15-SL	BD-13-15-SL
GW-BD1-121704	BW-BR12-27-38-GW-SS	SW-08-SW	BD-11-00-SL	BD-13-23-SL	BD-14-05-SL
GW-BD13-122804	BW-BR7-65-75-GW-SS	SW-08-SW-FD	BD-12-00-SL	BD-13-30-SL	BD-14-13-SL
GW-BD14-122904	BW-BR9-49-58-GW-SS	SW-09-SW	BP-01-00-SL	BD-14-05-SL	BD-15-05-SL
GW-BD16-122204	GW-BR10JC-121304	SW-14-SW	BP-02-00-SL	BD-14-13-SL	BD-16-05-SL
GW-BD2-121604	GW-BR11JC-121304	SW-15-SW	BP-03-00-SL	BD-14-25-SL	BD-16-15-SL
GW-BD3-121704	GW-BR12JC-120804	SW-16-SW	BP-04-00-SL	BD-14-31-SL	BLD240-01-01
GW-BD4-121704	GW-BR1JC-120604	US-01-SW	BP-05-00-SL	BD-15-05-SL	BLD240-03-04
GW-BD5-121504	GW-BR1JC-121704	US-02-SW	BP-06-00-SL	BD-15-17-SL	BLD240-03-14
GW-BD6-121404	GW-BR2JC-120804	US-03-SW	BP-07-00-SL	BD-15-25-SL	BLD240-04-02
GW-BD7-121504	GW-BR3JC-120904	US-04-SW	BP-08-00-SL	BD-15-31-SL	BLD240-05-01
GW-BD8-122804	GW-BR4JC-121404	US-05-SW	BP-09-00-SL	BD-16-05-SL	BLD253-02-01
GW-BP17-122204	GW-BR5JC-121304		BP-10-00-SL	BD-16-15-SL	BLD255-07-02
GW-BP22A-122804	GW-BR7JC-121504		BP-11-00-SL	BD-16-19-SL	BLD255-08-01
GW-BP22B-122804	GW-BR8JC-120604		BP-12-00-SL	BD-16-25-SL	BLD260-06-01
GW-BR10OB-120804	GW-BR9JC-121404		CB-01-00-SL	BD-16-34-SL	BP-13-05-SL
GW-BR3OB-120804	GW-PW6JC-121604		CB-01-00-SL-FD	BLD240-01-01	BP-13-11-SL
GW-BR6OB-120704	GW-PZ3-121704		DM-01-00-SL	BLD240-01-31	BP-13-15-SL
GW-BR8OB-120604	GW-PZ4-121304		DM-02-00-SL	BLD240-01-31FD	BP-17-05-SL
GW-CB02-121404	GW-WS30-121604		EP-01-00-SL	BLD240-03-04	BP-17-15-SL
GW-DM02-122204	GW-WS31-121604		EP-02-00-SL	BLD240-03-14	BP-18-05-SL
GW-EP15-121004	BR5-236-OL-GW		EP-03-00-SL	BLD240-04-02	BP-18-15-SL
GW-EP16-121304	BW-BR6-65-80-GW-SS		EP-04-00-SL	BLD240-04-33	BP-19-05-SL
GW-EP20-121504	GW-BR10RB-121304		EP-04-00-SL-FD	BLD240-05-01	BP-19-13-SL
GW-FD1-120704	GW-BR12RB-120804		EP-05-00-SL	BLD240-05-23	BP-20-03-SL
GW-FD2-121304	GW-BR1RB-120704		EP-06-00-SL	BLD253-02-01	BP-21-07-SL
GW-FD3-121304	GW-BR2RB-120804		EP-07-00-SL	BLD253-02-21	BP-21-07-SL-FD
GW-FD4-121404	GW-BR3RB-120904		EP-08-00-SL	BLD253-02-21FD	BP-21-13-SL
GW-FD5-121604	GW-BR4RB-121004		EP-09-00-SL	BLD255-07-02	BP-22-05-SL
GW-FD6-121304	GW-BR5RB-121004		EP-10-00-SL	BLD255-07-33	BP-22-13-SL
GW-FD7-122004	GW-BR6RB-120704		EP-11-00-SL	BLD255-08-01	CB-02-05-SL
GW-LF08-122104	GW-BR7RB-121404		EP-12-00-SL	BLD255-08-24	CB-02-05-SL-FD
GW-LF09-122004	GW-BR8RB-120704		GS-01-00-SL	BLD260-06-01	CB-02-15-SL
GW-NB31-122104	GW-PW6RB-121704		GS-01-00-SL-FD	BLD260-06-31	EP-13-06-SL
GW-NB32-122004	GW-PW19RB-121504		GS-02-00-SL	BP-13-05-SL	EP-13-13-SL
GW-NB33-122104	GW-PW19JC-121504		GS-03-00-SL	BP-13-11-SL	EP-14-05-SL
GW-NB34-120704	GW-PW16RB-121604		GS-04-00-SL	BP-13-15-SL	EP-14-13-SL
GW-NB35-122104	GW-PW16JC-121604		GS-05-00-SL	BP-13-25-SL	EP-15-05-SL
GW-NB36-122204			LF-01-00-SL	BP-13-35-SL	EP-15-13-SL
GW-NB38-120904			LF-02-00-SL	BP-17-05-SL	EP-16-05-SL
GW-NB39-121504			LF-03-00-SL	BP-17-15-SL	EP-16-15-SL
GW-NB44-120604			LF-04-00-SL	BP-17-23-SL	EP-17-05-SL
GW-NB46-121004			LF-05-00-SL	BP-17-31-SL	EP-17-15-SL
GW-NB50-121604			NB-01-00-SL	BP-18-05-SL	EP-18-09-SL
GW-NB54-122004			NB-02-00-SL	BP-18-15-SL	EP-18-09-SL-FD
GW-NB56-121604			NB-03-00-SL	BP-18-25-SL	EP-18-15-SL
GW-NB57A-121404			NB-04-00-SL	BP-18-31-SL	EP-19-05-SL
GW-NB57B-121504			NB-05-00-SL	BP-19-05-SL	EP-19-13-SL
GW-NB61-122204			NB-06-00-SL	BP-19-13-SL	EP-20-05-SL
GW-NB63-120704			NB-07-00-SL	BP-19-25-SL	EP-20-15-SL
GW-NB64-122104			NB-07-00-SL-FD	BP-19-29-SL	GS-06-05-SL
GW-NB65-122004			NB-08-00-SL	BP-20-03-SL	GS-07-05-SL
GW-NB66-120604			NB-09-00-SL	BP-20-19-SL	GS-07-15-SL
GW-NB67-120704			NB-10-00-SL	BP-20-27-SL	GS-09-05-SL
GW-NB71-121304			NB-11-00-SL	BP-21-07-SL	GS-09-15-SL
GW-NB72-122104			NB-12-00-SL	BP-21-07-SL-FD	LF-06-05-SL
GW-NB73-122004			NB-13-00-SL	BP-21-13-SL	LF-06-13-SL
GW-NB74-121304			NB-14-00-SL	BP-21-24-SL	LF-07-03-SL
GW-NB77-122004			NB-15-00-SL	BP-21-34-SL	LF-07-15-SL
GW-NB78-122104			NB-16-00-SL	BP-22-05-SL	LF-08-03-SL
GW-NB79-121704			NB-17-00-SL	BP-22-13-SL	LF-08-03-SL-FD
GW-NB80-121704			NB-18-00-SL	BP-22-23-SL	LF-08-15-SL
GW-NB81-120904			NB-19-00-SL	BP-22-33-SL	LF-09-03-SL
GW-NB82-121004			NB-20-00-SL	CB-02-05-SL	NB-28-04-SL
GW-NB83-120904			NB-21-00-SL	CB-02-05-SL-FD	NB-28-14-SL
GW-NB84-120804			NB-22-00-SL	CB-02-15-SL	NB-29-05-SL
GW-NB85-120804			NB-23-00-SL	CB-02-25-SL	NB-29-14-SL
GW-NB86-120804			NB-24-00-SL	DM-02-05-SL	NB-30-05-SL
GW-OA19-122104			NB-25-00-SL	DM-02-17-SL	NB-30-15-SL
GW-OB1-121404			NB-26-00-SL	DM-02-25-SL	NB-31-05-SL
GW-OB2-121404			NB-27-00-SL	DM-02-33-SL	NB-31-15-SL
GW-PL04-122204			NB-27-00-SL-FD	DM-03-05-SL	NB-32-05-SL
GW-PL06-121504			OA-01-00-SL	DM-03-05-SL-FD	NB-32-15-SL
GW-RR05-120904			OA-01-00-SL-FD	DM-03-13-SL	NB-33-05-SL
GW-SW07-121004			OA-02-00-SL	DM-03-25-SL	NB-33-15-SL
GW-WS14-121604			OA-03-00-SL	DM-03-34-SL	NB-34-05-SL
GW-WS15-121604			OA-04-00-SL	EP-13-06-SL	NB-34-15-SL
GW-WS16-121604			OA-05-00-SL	EP-13-13-SL	NB-35-01-SL
GW-WS17B-121704			OA-06-00-SL	EP-13-25-SL	NB-35-15-SL
GW-WS22-121304			OA-07-00-SL	EP-13-30-SL	NB-36-05-SL
GW-WS23-121304			OA-08-00-SL	EP-14-05-SL	NB-36-15-SL
GW-WS24-121504			OA-09-00-SL	EP-14-13-SL	NB-37-05-SL
GW-WS25-121504			OA-10-00-SL	EP-14-25-SL	NB-37-15-SL

Note: Only radiological analytical is available for samples that are preceded by (*).

TABLE 1.4 SPECIFIC SAMPLING POINTS FOR CALCULATION OF EXPOSURE POINT CONCENTRATIONS
Westinghouse Electric Co. Hematite Site

1	2	3	4	5	6
Overburden wells	Bedrock wells	Surface water	Surface soil	Subsurface soil	Subsurface soil samples to depth of 15 feet
GW-WS26-121504			OA-11-00-SL	EP-14-31-SL	NB-38-09-SL
GW-WS27-121504			OA-12-00-SL	EP-15-05-SL	NB-38-15-SL
GW-WS28-121604			OA-13-00-SL	EP-15-13-SL	NB-39-05-SL
GW-WS29-121604			OA-14-00-SL	EP-15-25-SL	NB-39-15-SL
GW-WS32-121704			OA-15-00-SL	EP-15-29-SL	NB-40-05-SL
GW-WS34-121404			OA-16-00-SL	EP-16-05-SL	NB-40-05-SL-FD
GW-WS7-121304			OA-20-00-SL	EP-16-15-SL	NB-41-05-SL
GW-WS8-120904			OA-21-00-SL	EP-16-27-SL	NB-41-13-SL
NB-34-22-32-OL-GW-SS			OA-22-00-SL	EP-17-05-SL	NB-42-05-SL
EP-20-20-30-OL-GW*			OA-23-00-SL	EP-17-15-SL	NB-42-13-SL
NB-30-27-32-OL-GW*			OA-24-00-SL	EP-17-25-SL	NB-43-05-SL
NB-32-24-34-OL-GW*			OA-25-00-SL	EP-17-30-SL	NB-43-13-SL
NB-35-24-29-OL-GW*			OA-26-00-SL	EP-18-09-SL	NB-44-05-SL
			OA-27-00-SL	EP-18-09-SL-FD	NB-44-05-SL-FD
			OA-28-00-SL	EP-18-15-SL	NB-44-11-SL
			OA-29-00-SL	EP-18-29-SL	NB-45-05-SL
			OA-30-00-SL	EP-19-05-SL	NB-45-05-SL-FD
			OA-31-00-SL	EP-19-13-SL	NB-45-13-SL
			OA-32-00-SL	EP-19-25-SL	NB-46-09-SL
			OA-33-00-SL	EP-19-31-SL	NB-47-05-SL
			OA-34-00-SL	EP-20-05-SL	NB-47-15-SL
			OA-35-00-SL	EP-20-15-SL	NB-48-05-SL
			OA-36-00-SL	EP-20-25-SL	NB-48-11-SL
			OA-37-00-SL	GS-06-05-SL	NB-48-15-SL
			OA-38-00-SL	GS-06-19-SL	NB-49-05-SL
			OA-39-00-SL	GS-06-25-SL	NB-49-05-SL-FD
			OA-40-00-SL	GS-07-05-SL	NB-49-15-SL
			PL-01-00-SL	GS-07-15-SL	NB-50-05-SL
			PL-02-00-SL	GS-07-25-SL	NB-50-15-SL
			PL-03-00-SL	GS-09-05-SL	NB-51-05-SL
			RR-01-00-SL	GS-09-15-SL	NB-51-13-SL
			RR-02-00-SL	GS-09-23-SL	NB-52-05-SL
			RR-03-00-SL	LF-06-05-SL	NB-52-13-SL
			SW-01-00-SL	LF-06-13-SL	NB-53-05-SL
			SW-02-00-SL	LF-06-27-SL	NB-53-13-SL
			SW-03-00-SL	LF-06-32-SL	NB-54-05-SL
			SW-04-00-SL	LF-07-03-SL	NB-54-13-SL
			BG-01-00-SL*	LF-07-15-SL	NB-55-05-SL
			BG-02-00-SL*	LF-07-25-SL	NB-55-13-SL
			BG-03-00-SL*	LF-07-34-SL	NB-56-05-SL
			BG-04-00-SL*	LF-08-03-SL	NB-56-13-SL
			BG-05-00-SL*	LF-08-03-SL-FD	NB-57-05-SL
			BG-06-00-SL*	LF-08-15-SL	NB-57-05-SL-FD
			BG-07-00-SL*	LF-08-21-SL	NB-57-15-SL
			BG-08-00-SL*	LF-08-37-SL	NB-58-05-SL
			BG-09-00-SL*	LF-09-03-SL	NB-58-15-SL
			BG-10-00-SL*	LF-09-17-SL	NB-59-05-SL
			BG-11-00-SL*	LF-09-25-SL	NB-59-13-SL
			BG-12-00-SL*	LF-09-31-SL	NB-60-05-SL
			BG-13-00-SL*	LS-01-00-SL	NB-60-13-SL
			BG-14-00-SL*	LS-02-00-SL	NB-61-05-SL
			BG-15-00-SL*	LS-03-00-SL	NB-61-13-SL
			BG-16-00-SL*	NB-28-04-SL	NB-62-05-SL
				NB-28-14-SL	NB-62-12-SL
				NB-28-24-SL	NB-63-05-SL
				NB-28-35-SL	NB-63-13-SL
				NB-39-05-SL	NB-64-05-SL
				NB-39-15-SL	NB-64-13-SL
				NB-39-25-SL	NB-65-05-SL
				NB-39-30-SL	NB-65-13-SL
				NB-46-09-SL	NB-66-05-SL
				NB-46-17-SL	NB-66-05-SL-FD
				NB-46-25-SL	NB-66-15-SL
				NB-46-29-SL	NB-67-05-SL
				NB-47-05-SL	NB-67-11-SL
				NB-47-15-SL	NB-68-05-SL
				NB-47-25-SL	NB-68-13-SL
				NB-47-31-SL	NB-69-05-SL
				NB-48-05-SL	NB-69-15-SL
				NB-48-11-SL	NB-70-05-SL
				NB-48-15-SL	NB-70-15-SL
				NB-48-25-SL	NB-71-05-SL
				NB-48-35-SL	NB-71-05-SL-FD
				NB-49-05-SL	NB-71-13-SL
				NB-49-05-SL-FD	NB-72-05-SL
				NB-49-15-SL	NB-72-11-SL
				NB-49-25-SL	NB-73-05-SL
				NB-49-37-SL	NB-73-13-SL
				NB-50-05-SL	NB-74-05-SL
				NB-50-15-SL	NB-75-08-SL
				NB-50-25-SL	NB-75-15-SL
				NB-50-37-SL	NB-76-06-SL
				NB-51-05-SL	NB-76-10-SL
				NB-51-13-SL	NB-77-05-SL

Note: Only radiological analytical is available for samples that are preceded by (*).

TABLE 1.4 SPECIFIC SAMPLING POINTS FOR CALCULATION OF EXPOSURE POINT CONCENTRATIONS
Westinghouse Electric Co. Hematite Site

1	2	3	4	5	6
Overburden wells	Bedrock wells	Surface water	Surface soil	Subsurface soil	Subsurface soil samples to depth of 15 feet
				NB-51-25-SL	NB-77-13-SL
				NB-51-37-SL	NB-78-07-SL
				NB-52-05-SL	NB-78-11-SL
				NB-52-13-SL	NB-79-05-SL
				NB-52-25-SL	NB-79-05-SL-FD
				NB-52-35-SL	NB-79-11-SL
				NB-53-05-SL	NB-80-05-SL
				NB-53-13-SL	NB-80-11-SL
				NB-53-23-SL	NB-81-05-SL
				NB-53-33-SL	NB-81-13-SL
				NB-54-05-SL	NB-82-05-SL
				NB-54-13-SL	NB-82-11-SL
				NB-54-25-SL	NB-83-05-SL
				NB-54-31-SL	NB-83-11-SL
				NB-55-05-SL	NB-84-05-SL
				NB-55-13-SL	NB-84-15-SL
				NB-55-25-SL	NB-85-05-SL
				NB-55-33-SL	NB-85-15-SL
				NB-56-05-SL	NB-86-05-SL
				NB-56-13-SL	NB-86-15-SL
				NB-56-25-SL	OA-18-03-SL
				NB-56-33-SL	OA-19-05-SL
				NB-57-05-SL	OA-19-15-SL
				NB-57-05-SL-FD	PL-04-05-SL
				NB-57-15-SL	PL-04-13-SL
				NB-57-29-SL	PL-05-05-SL
				NB-57-34-SL	PL-05-15-SL
				NB-58-05-SL	PL-06-07-SL
				NB-58-15-SL	PL-06-13-SL
				NB-58-29-SL	RR-04-05-SL
				NB-58-36-SL	RR-04-15-SL
				NB-59-05-SL	RR-05-05-SL
				NB-59-13-SL	RR-05-05-SL-FD
				NB-59-25-SL	RR-05-15-SL
				NB-59-31-SL	SW-02-01-SL
				NB-60-05-SL	SW-02-09-SL
				NB-60-13-SL	SW-02-15-SL
				NB-60-23-SL	SW-05-08-SL
				NB-60-31-SL	SW-05-12-SL
				NB-61-05-SL	SW-06-05-SL
				NB-61-13-SL	SW-06-05-SL-FD
				NB-61-23-SL	SW-06-13-SL
				NB-61-28-SL	SW-07-05-SL
				NB-68-05-SL	SW-07-15-SL
				NB-68-13-SL	SW-08-03-SL
				NB-68-17-SL	SW-08-05-SL
				NB-68-25-SL	SW-08-15-SL
				NB-68-33-SL	DM-02-05-SL
				NB-69-05-SL	DM-03-05-SL
				NB-69-15-SL	DM-03-05-SL-FD
				NB-69-22-SL	DM-03-13-SL
				NB-69-34-SL	BLD240-05-02*
				NB-70-05-SL	BLD253-02-04*
				NB-70-15-SL	BLD253-02-Concrete*
				NB-70-23-SL	BLD253-02-Fill*
				NB-70-33-SL	BLD253-02-FillFD*
				NB-71-05-SL	BLD255-05-01*
				NB-71-05-SL-FD	BLD255-05-23*
				NB-71-13-SL	BLD255-05-Concrete*
				NB-71-27-SL	BLD255-05-Fill*
				NB-74-05-SL	BLD255-07-15*
				NB-74-17-SL	BLD255-07-Concrete*
				NB-74-25-SL	BLD255-07-ConcreteFD*
				NB-74-33-SL	BLD255-07-Fill*
				NB-79-05-SL	BLD255-08-08*
				NB-79-05-SL-FD	BLD255-08-CONCRETE*
				NB-79-11-SL	BLD260-06-03*
				NB-79-24-SL	BLD260-06-CONCRETE*
				NB-80-05-SL	BLD260-06-FILL*
				NB-80-11-SL	LF-08-05-SL*
				NB-80-27-SL	LF-08-05-SL-FD*
				NB-81-05-SL	RR-04-07-SL*
				NB-81-13-SL	
				NB-81-31-SL	
				OA-18-03-SL	
				OA-18-17-SL	
				OA-18-25-SL	
				OA-18-33-SL	
				OA-19-05-SL	
				OA-19-15-SL	
				OA-19-25-SL	
				OA-19-33-SL	
				PL-04-05-SL	
				PL-04-13-SL	

Note: Only radiological analytical is available for samples that are preceded by (*).

1	2	3	4	5	6
Overburden wells	Bedrock wells	Surface water	Surface soil	Subsurface soil	Subsurface soil samples to depth of 15 feet
				PL-04-23-SL	
				PL-04-31-SL	
				PL-05-05-SL	
				PL-05-15-SL	
				PL-05-28-SL	
				PL-06-07-SL	
				PL-06-13-SL	
				PL-06-17-SL	
				PL-06-29-SL	
				PL-06-33-SL	
				RR-04-05-SL	
				RR-04-15-SL	
				RR-04-25-SL	
				RR-05-05-SL	
				RR-05-05-SL-FD	
				RR-05-15-SL	
				RR-05-25-SL	
				SW-02-01-SL	
				SW-02-09-SL	
				SW-02-15-SL	
				SW-02-23-SL	
				SW-05-08-SL	
				SW-05-12-SL	
				SW-06-05-SL	
				SW-06-05-SL-FD	
				SW-06-13-SL	
				SW-06-23-SL	
				SW-07-05-SL	
				SW-07-15-SL	
				SW-07-23-SL	
				SW-08-03-SL	
				SW-08-05-SL	
				SW-08-15-SL	
				SW-08-25-SL	
				NB-29-05-SL	
				NB-29-14-SL	
				NB-29-22-SL	
				NB-30-05-SL	
				NB-30-15-SL	
				NB-30-25-SL	
				NB-30-33-SL	
				NB-31-05-SL	
				NB-31-15-SL	
				NB-31-27-SL	
				NB-31-32-SL	
				NB-32-05-SL	
				NB-32-15-SL	
				NB-32-27-SL	
				NB-32-33-SL	
				NB-33-05-SL	
				NB-33-15-SL	
				NB-33-27-SL	
				NB-34-05-SL	
				NB-34-15-SL	
				NB-34-25-SL	
				NB-35-01-SL	
				NB-35-15-SL	
				NB-35-25-SL	
				NB-36-05-SL	
				NB-36-15-SL	
				NB-36-27-SL	
				NB-37-05-SL	
				NB-37-15-SL	
				NB-37-25-SL	
				NB-38-09-SL	
				NB-38-15-SL	
				NB-38-25-SL	
				NB-40-05-SL	
				NB-40-05-SL-FD	
				NB-40-17-SL	
				NB-40-25-SL	
				NB-40-31-SL	
				NB-41-05-SL	
				NB-41-13-SL	
				NB-41-19-SL	
				NB-42-05-SL	
				NB-42-13-SL	
				NB-42-23-SL	
				NB-43-05-SL	
				NB-43-13-SL	
				NB-44-05-SL	
				NB-44-05-SL-FD	
				NB-44-11-SL	
				NB-44-18-SL	

Note: Only radiological analytical is available for samples that are preceded by (*).

TABLE 1.4 SPECIFIC SAMPLING POINTS FOR CALCULATION OF EXPOSURE POINT CONCENTRATIONS
Westinghouse Electric Co. Hematite Site

1	2	3	4	5	6
Overburden wells	Bedrock wells	Surface water	Surface soil	Subsurface soil	Subsurface soil samples to depth of 15 feet
				NB-45-05-SL	
				NB-45-05-SL-FD	
				NB-45-13-SL	
				NB-45-25-SL	
				NB-45-33-SL	
				NB-62-05-SL	
				NB-62-12-SL	
				NB-62-22-SL	
				NB-63-05-SL	
				NB-63-13-SL	
				NB-63-19-SL	
				NB-64-05-SL	
				NB-64-13-SL	
				NB-64-17-SL	
				NB-65-05-SL	
				NB-65-13-SL	
				NB-65-17-SL	
				NB-66-05-SL	
				NB-66-05-SL-FD	
				NB-66-15-SL	
				NB-66-19-SL	
				NB-67-05-SL	
				NB-67-11-SL	
				NB-67-21-SL	
				NB-72-05-SL	
				NB-72-11-SL	
				NB-72-19-SL	
				NB-72-22-SL	
				NB-73-05-SL	
				NB-73-13-SL	
				NB-73-23-SL	
				NB-75-08-SL	
				NB-75-15-SL	
				NB-75-19-SL	
				NB-76-06-SL	
				NB-76-10-SL	
				NB-76-24-SL	
				NB-77-05-SL	
				NB-77-13-SL	
				NB-77-24-SL	
				NB-78-07-SL	
				NB-78-11-SL	
				NB-78-18-SL	
				NB-82-05-SL	
				NB-82-11-SL	
				NB-82-20-SL	
				NB-83-05-SL	
				NB-83-11-SL	
				NB-83-23-SL	
				NB-84-05-SL	
				NB-84-15-SL	
				NB-84-23-SL	
				NB-84-33-SL	
				NB-85-05-SL	
				NB-85-15-SL	
				NB-85-25-SL	
				NB-85-35-SL	
				NB-86-05-SL	
				NB-86-15-SL	
				NB-86-19-SL	
				BLD240-05-02*	
				BLD253-02-04*	
				BLD253-02-Concrete*	
				BLD253-02-Fill*	
				BLD253-02-FillFD*	
				BLD255-05-01*	
				BLD255-05-23*	
				BLD255-05-Concrete*	
				BLD255-05-Fill*	
				BLD255-07-15*	
				BLD255-07-Concrete*	
				BLD255-07-ConcreteFD*	
				BLD255-07-Fill*	
				BLD255-08-08*	
				BLD255-08-CONCRETE*	
				BLD260-06-03*	
				BLD260-06-CONCRETE*	
				BLD260-06-FILL*	
				EP-20-20-30-OL-GW*	
				LF-08-05-SL*	
				LF-08-05-SL-FD*	
				RR-04-07-SL*	

Note: Only radiological analytical is available for samples that are preceded by (*).

TABLE 2.1
SUMMARY OF CONSTITUENTS OF POTENTIAL CONCERN
Westinghouse Electric Co. Hematite Site

Medium	CAS Number	Constituent of Potential Concern (1)(3)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits
Groundwater	75-35-4	1,1-Dichloroethene	0.7 J	5100 J	ppb	GW-BD2-121604	60/138	5-25000
	156-59-2	cis-1,2-Dichloroethene	1 J	1900	ppb	GW-BD6-121404	75/138	5-25000
	75-09-2	Methylene chloride	1.8 J	1600	ppb	GW-FD7-122004	24/138	5-25000
	127-18-4	Tetrachloroethene	1.4 J	200000	ppb	GW-BD2-121604	79/138	5-25000
	156-60-5	trans-1,2-Dichloroethene	1 J	700 E	ppb	GW-BD13-122804	22/138	5-25000
	79-01-6	Trichloroethene	1.2 J	18000	ppb	GW-BD6-121404	81/138	5-25000
	75-01-4	Vinyl chloride	0.68 J	1000 E	ppb	GW-BD6-121404	29/138	10-50000
	117-81-7	bis(2-Ethylhexyl)phthalate	4 J	26	ppb	GW-LF08-122104	8/42	9.4-11
	7440-38-2	Arsenic	0.01	0.13	ppm	GW-WS23-121304	13/115	0.01
	7439-92-1	Lead	0.0032	0.059	ppm	GW-WS23-121304	18/115	0.003-0.006
		Radium 226	-0.015U	2.22	pCi/l	GW-FD4-121404	11/16	0.01-0.65
		Neptunium 237	-0.011U	0.018	pCi/l	GW-BD16-122204	1/32	0.01-0.016
		Plutonium 239	-0.012U	0.018U	pCi/l	GW-BR2RB-120804	0/32	0.01-0.018
		Uranium 238	-0.002U	56.3	pCi/l	GW-DM02-122204	55/115	0.02-0.09
		Uranium 235	-0.04U	0.19	pCi/l	GW-BR6OB-120704	35/115	0.01-0.1
		Uranium 234	-0.04U	12.5	pCi/l	GW-BR12RB-120804	60/115	0.01-1.3
		Thorium 232	-0.01U	0.24	pCi/l	GW-OB2-121404	26/115	0.01-0.07
		Thorium 230	-0.07U	0.31	pCi/l	GW-OB2-121404	2/115	0.01-0.2
		Technetium 99	-2.83U	5100	pCi/l	GW-BD2-121604	26/115	0.01-0.22
Surface Water	7440-38-2	Arsenic	0.011	0.011	ppm	SW-01-SW	1/13	0.01
	7439-92-1	Lead	0.068	0.068	ppm	SW-01-SW	1/13	0.003
	7440-62-2	Vanadium	0.045	0.045	ppm	SW-01-SW	1/13	0.01
	127-18-4	Tetrachloroethene	0.73 J	2.1 J	ppb	SW-01-SW	3/13	5
	79-01-6	Trichloroethene	0.64 J	0.84 J	ppb	SW-09-SW	2/13	5
		Uranium 238	0.152	4.77	pCi/l	SW-01-SW	13/13	0.02-0.1
		Uranium 235	0.004U	0.14J	pCi/l	SW-02-SW	7/13	0.01-0.07
		Uranium 234	---	1.49	pCi/l	SW-02-SW	1/1	0.08
		Thorium 232	-0.013U	0.029U	pCi/l	SW-02-SW	0/13	0.01-0.03
		Thorium 230	-0.034U	0.045U	pCi/l	US-04-SW	0/13	0.01-0.05
		Technetium 99	-2.31U	3.16U	pCi/l	US-02-SW	0/13	0.01-0.22
Surface Soil	56-55-3	Benzo(a)anthracene	18 J	6400	ppb	BD-10-00-SL	82/121	360-1600
	50-32-8	Benzo(a)pyrene	16 J	6600	ppb	BD-10-00-SL	81/121	360-1600
	205-99-2	Benzo(b)fluoranthene	20 J	7800	ppb	BD-10-00-SL	87/121	360-1600
	193-39-5	Indeno(1,2,3-cd)pyrene	29 J	5800 E	ppb	OA-16-00-SL	48/121	360-1600
	11097-69-1	Aroclor-1254 (PCB-1254)	21 J	540 J	ppb	RR-01-00-SL	15/121	36-200
	11096-82-5	Aroclor-1260 (PCB-1260)	3.6 J	560	ppb	LF-01-00-SL	27/121	36-200
	7440-38-2	Arsenic	1.1	160	ppm	EP-06-00-SL	121/121	0.76-1.2
	7440-47-3	Chromium Total	4.9	280	ppm	BD-10-00-SL	121/121	0.43-0.66
	7439-92-1	Lead	3.7	1400	ppm	OA-13-00-SL	121/121	0.35-3.9
		Radium 226	0.166U	1.71	pCi/g	NB-04-00-SL	106/121	0.17-1.0
		Neptunium 237	-36.6U	2610	pCi/g	DM-01-00-SL	20/121	0.01-156
		Plutonium 239	-0.002U	0.0334	pCi/g	NB-03-00-SL	7/30	0.002-0.013
		Uranium 238	-0.484U	705	pCi/g	OA-04-00-SL	56/121	0.1-23.2
		Uranium 235	-0.285U	308	pCi/g	DM-01-00-SL	43/121	0.1-5.5
		Thorium 232	-0.054U	36.4	pCi/g	BP-08-00-SL	84/121	0.1-1.9
		Technetium 99	-0.429U	17100	pCi/g	EP-10-00-SL	65/121	0.1-6.6
Subsurface Soil	127-18-4	Tetrachloroethene	1.1 J	6600000	ppb	BLD253-02-21	127/428	5.3-7.4
	79-01-6	Trichloroethene	1.2 J	1600	ppb	BLD255-08-24	98/428	5.3-65000
	7440-38-2	Arsenic	1.1	24	ppm	BP-18-25-SL	428/428	0.74-1
	7439-92-1	Lead	3.8	680	ppm	NB-75-19-SL	428/428	0.32-3.4
		Radium 226	-0.22U	1.53	pCi/g	NB-36-15-SL	307/428	0.02-0.72
		Neptunium 237	-30U	0.353	pCi/g	NB-35-15-SL	6/428	0.002-26
		Plutonium 239	0.002U	0.008	pci/g	BLD255-08-08	8/28	0.001-0.007
		Uranium 238	-1.9U	71	pCi/g	BLD240-03-Fill	21/428	0.1-6
		Uranium 235	0.54U	23.1	pCi/g	BLD255-08-01	42/428	0.1-1.7
		Uranium 234	17.8	604	pCi/g	BLD255-08-01	6/6	0.01-0.07
		Thorium 230	0.675M3	1.74M3	pCi/g	DM-02-22-SL	18/18	0.02-0.19
		Thorium 232	0.418	1.21	pCi/g	SW-02-01-SL	16/16	0.003-0.03
		Technetium 99	-0.828U	131	pCi/g	EP-13-30-SL	58/428	0.1-1.6

Footnote Instructions:

(1) Chemicals selected based on exceeding the screening level (Table 2.2-2.19) or other criteria (Table 2.20-2.30), based on EPA, 1994.

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.

(3) All listed radioactive isotopes include a contribution from the ambient background.

TABLE 2.2 VOCs

SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1

Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Groundwater	71-55-6	1,1,1-Trichloroethane	1.3 J	85	ppb	NB-34-22-32-OL-GW-SS	11/138	5-25000	85	3.17E+03	N	BSL
	79-00-5	1,1,2-Trichloroethane	1.4 J	8	ppb	GW-NB80-121704	5/138	5-25000	8	2.00E-01	Y	ASL
	75-34-3	1,1-Dichloroethane	1.3 J	610 =	ppb	GW-BD6-121404	63/138	5-25000	610	8.11E+02	N	BSL
	75-35-4	1,1-Dichloroethene	0.7 J	5100 J	ppb	GW-BD2-121604	60/138	5-25000	5100	3.39E+02	Y	ASL
	107-06-2	1,2-Dichloroethane	1.1 J	9	ppb	GW-BD8-122804	9/138	5-25000	9	1.23E-01	Y	ASL
	78-93-3	2-Butanone (Methyl Ethyl Ketone)	29	150	ppb	GW-PW16JC-121604	2/138	10-50000	150	6.97E+03	N	BSL
	67-64-1	Acetone	9.9 J, B	76 J	ppb	GW-NB34-120704	5/138	10-50000	76	5.48E+03	N	BSL
	71-43-2	Benzene	1.3 J	4.8 J	ppb	GW-BD6-121404	2/138	5-25000	4.8	3.54E-01	Y	ASL
	75-15-0	Carbon disulfide	1 J	8 J	ppb	GW-DM02-122204	4/138	5-25000	8	1.04E+03	N	BSL
	75-00-3	Chloroethane	3 J	71	ppb	BP-21-25-35-OL-GW-SS	6/138	10-50000	71	4.64E+00	Y	ASL
	67-66-3	Chloroform (Trichloromethane)	1.1 J	6.8 =	ppb	GW-BD6-121404	5/138	5-25000	6.8	1.66E-01	Y	ASL
	74-87-3	Chloromethane (Methyl Chloride)	1.3 J	1.3 J	ppb	BW-BR6-65-80-GW-SS	1/138	10-50000	1.3	1.58E+02	N	BSL
	156-59-2	cis-1,2-Dichloroethene	1 J	1900 =	ppb	GW-BD6-121404	75/138	5-25000	1900	6.08E+01	Y	ASL
	75-09-2	Methylene chloride	1.8 J	1600	ppb	GW-FD7-122004	24/138	5-25000	1600	4.28E+00	Y	ASL
	95-47-6	o-Xylene	3.7 J	3.7 J	ppb	GW-BD6-121404	1/138	5-25000	3.7	2.06E+02	N	BSL
	127-18-4	Tetrachloroethene	1.4 J	200000	ppb	GW-BD2-121604	79/138	5-25000	200000	1.04E-01	Y	ASL
	108-88-3	Toluene	0.57 J	3.7 J	ppb	GW-PZ3-121704	6/138	5-25000	3.7	7.23E+02	N	BSL
	156-60-5	trans-1,2-Dichloroethene	1 J	700 E	ppb	GW-BD13-122804	22/138	5-25000	700	1.22E+02	Y	ASL
	79-01-6	Trichloroethene	1.2 J	18000 =	ppb	GW-BD6-121404	81/138	5-25000	18000	2.80E-02	Y	ASL
	75-01-4	Vinyl chloride	0.68 J	1000 E	ppb	GW-BD6-121404	29/138	10-50000	1000	1.98E-02	Y	ASL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.
U: Indicates that the compound was analyzed for but was not detected above the reported SQL.
B: This flag is used when the analyte is detected in the associated method blank as well as in the sample.
= : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.3 VOCs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Water	156-59-2	cis-1,2-Dichloroethene	0.66 J	4.4 J	ppb	SW-09-SW	2/13	5	4.4	6.1E+01	N	BSL
	75-09-2	Methylene chloride	1.1 J, B	3.3 J,B	ppb	US-02-SW	8/13	5	3.3	4.3E+00	N	BSL
	127-18-4	Tetrachloroethene	0.73 J	2.1 J	ppb	SW-01-SW	3/13	5	2.1	5.0E+00	N	BSL
	108-88-3	Toluene	0.85 J	0.85 J	ppb	US-02-SW	1/13	5	0.85	7.2E+02	N	BSL
	79-01-6	Trichloroethene	0.64 J	0.84 J	ppb	SW-09-SW	2/13	5	0.84	5.0E+00	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
B: This flag is used when the analyte is detected in the associated method blank as well as in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water, MRBCA DTLs used for TCE and PCE

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.4 VOCs

SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1

Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Soil	67-64-1	Acetone	7 J	8.5 J	ppb	GS-05-00-SL	4/121	11-16	8.5	1.41E+07	N	BSL
	NA	Diesel Range Organics	15	35	ppb	GS-04-00-SL	3/6	5.9-13	35	4.14E+06	N	BSL
	NA	Gasoline Range Organics, C6-C14	0.29 J	0.29 J	ppb	GS-04-00-SL	1/6	0.59-0.66	0.29	3.83E+05	N	BSL
	108-38-3/106-42-3	m&p-Xylene	2.5 J	2.5 J	ppb	EP-04-00-SL-FD	1/121	5.4-8.2	2.5	2.71E+05	N	BSL
	75-09-2	Methylene chloride	1.1 J, B	8.1 B	ppb	BD-10-00-SL	65/121	5.4-8.2	8	9.11E+03	N	BSL
	127-18-4	Tetrachloroethene	1.6 J	34	ppb	BD-10-00-SL	10/121	5.4-8.2	34	4.84E+02	N	BSL
	108-88-3	Toluene	1.6 J	9.3	ppb	EP-04-00-SL-FD	3/121	5.4-8.2	9.3	5.20E+05	N	BSL
	79-01-6	Trichloroethene	1.3 J	1.3 J	ppb	BD-10-00-SL	1/121	5.4-8.2	1.3	5.30E+01	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
B: This flag is used when the analyte is detected in the associated method blank as well as in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs; MDNR DTLs (March 3, 2005) used for DRO and GRO screening toxicity value.

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.5 VOCs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Subsurface Soil	71-55-6	1,1,1-Trichloroethane	1.3 J	360 E	ppb	EP-17-30-SL	25/428	5.3-65000	360	1.2E+06	N	BSL
	75-34-3	1,1-Dichloroethane	1.6 J	190 E	ppb	BP-19-25-SL	47/428	5.3-65000	190	5.1E+05	N	BSL
	75-35-4	1,1-Dichloroethene	1.6 J	3600 J	ppb	BLD253-02-21	47/428	5.3-65000	3600	1.2E+05	N	BSL
	120-82-1	1,2,4-Trichlorobenzene	2.5 J	2.5 J	ppb	BLD253-02-21	1/428	5.3-65000	2.5	6.2E+04	N	BSL
	107-06-2	1,2-Dichloroethane	1.9 J	10	ppb	BP-22-33-SL	5/428	5.3-65000	10	2.8E+02	N	BSL
	78-93-3	2-Butanone (Methyl Ethyl Ketone)	7 J	46	ppb	LF-06-05-SL	15/428	11-130000	46	2.2E+07	N	BSL
	67-64-1	Acetone	7.1 J, B	220	ppb	LF-06-05-SL	106/428	11-130000	220	1.4E+07	N	BSL
	75-15-0	Carbon disulfide	1.5 J	290 E	ppb	SW-02-23-SL	4/428	5.3-65000	290	3.6E+05	N	BSL
	56-23-5	Carbon tetrachloride	45	45	ppb	BLD253-02-21	1/428	5.3-65000	45	2.5E+02	N	BSL
	75-00-3	Chloroethane	3.1 J	29	ppb	BP-22-33-SL	2/428	11-130000	29	3.0E+03	N	BSL
	67-66-3	Chloroform (Trichloromethane)	5.5 J	12	ppb	BLD253-02-21	2/428	5.3-65000	12	2.2E+02	N	BSL
	156-59-2	cis-1,2-Dichloroethene	1.5 J	430 E	ppb	OA-19-33-SL	70/428	5.3-65000	430	4.3E+04	N	BSL
	127-18-4	Tetrachloroethene	1.1 J	6600000	ppb	BLD253-02-21	127/428	5.3-7.4	6600000	4.8E+02	Y	ASL
	108-88-3	Toluene	1.3 J	15	ppb	BLD253-02-21	26/428	5.3-65000	15	5.2E+05	N	BSL
	156-60-5	trans-1,2-Dichloroethene	1.7 J	22	ppb	OA-19-33-SL	6/428	5.3-65000	22	6.9E+04	N	BSL
	79-01-6	Trichloroethene	1.2 J	1600	ppb	BLD255-08-24	98/428	5.3-65000	1600	5.3E+01	Y	ASL
	75-01-4	Vinyl chloride	1.6 J	15	ppb	BP-22-33-SL	12/428	11-130000	15	7.9E+01	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.
B: This flag is used when the analyte is detected in the associated method blank as well as in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.6 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Groundwater	117-81-7	bis(2-Ethylhexyl)phthalate	4 J	26	ppb	GW-LF08-122104	8/42	9.4-11	26	4.8E+00	Y	ASL
	67-72-1	Hexachloroethane	6.5 J	6.5 J	ppb	GW-BD2-121604	1/42	9.4-11	6.5	1.1E+04	N	BSL
	108-95-2	Phenol	2.1 J	9.8 J	ppb	GW-BD7-121504	2/42	9.4-11	9.8	4.8E+00	Y	ASL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water; PRG for Aroclor-1254 is used for Aroclor-1260.

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.7 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Surface Water	206-44-0	Fluoranthene	0.97 J	0.97 J	ppb	SW-01-SW	1/13	9.4-10	0.97	1.5E+03	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.8 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Surface Soil	83-32-9	Acenaphthene	12 J	380 J	ppb	OA-16-00-SL	19/121	360-1600	380	3.68E+06	N	BSL
	120-12-7	Anthracene	29 J	1100	ppb	OA-16-00-SL	20/121	360-1600	1,100	2.19E+07	N	BSL
	56-55-3	Benzo(a)anthracene	18 J	6400	ppb	BD-10-00-SL	82/121	360-1600	6400	6.21E+02	Y	ASL
	50-32-8	Benzo(a)pyrene	16 J	6600	ppb	BD-10-00-SL	81/121	360-1600	6600	6.21E+01	Y	ASL
	205-99-2	Benzo(b)fluoranthene	20 J	7800	ppb	BD-10-00-SL	87/121	360-1600	7,800	6.21E+02	Y	ASL
	207-08-9	Benzo(k)fluoranthene	25 J	3200	ppb	BD-10-00-SL	52/121	360-1600	3,200	6.21E+03	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	79 J	4700	ppb	OA-08-00-SL	23/121	360-1600	4700	3.47E+04	N	BSL
	85-68-7	Butyl benzylphthalate	29 J	220 J	ppb	BD-10-00-SL	10/121	360-1600	220	1.22E+07	N	BSL
	86-74-8	Carbazole	22 J	910	ppb	OA-16-00-SL	21/121	360-1600	910	2.43E+04	N	BSL
	218-01-9	Chrysene	18 J	8100	ppb	BD-10-00-SL	81/121	360-1600	8100	6.21E+04	N	BSL
	53-70-3	Dibenz(a,h)anthracene	35 J	440	ppb	OA-15-00-SL	3/121	360-1600	440	6.21E+01	Y	ASL
	84-74-2	Di-n-butylphthalate	26 J	4300	ppb	EP-04-00-SL-FD	20/121	360-1600	4300	6.11E+06	N	BSL
	117-84-0	Di-n-octyl phthalate	84 J	350 J	ppb	DM-02-00-SL	2/121	360-1600	350	2.44E+06	N	BSL
	206-44-0	Fluoranthene	16 J	8800 E	ppb	OA-16-00-SL	94/121	360-1600	8800	2.29E+06	N	BSL
	86-73-7	Fluorene	19 J	530	ppb	OA-16-00-SL	17/121	360-1600	530	2.75E+06	N	BSL
	118-74-1	Hexachlorobenzene	40 J	40 J	ppb	EP-02-00-SL	1/121	360-1600	40	3.47E+04	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	29 J	5800 E	ppb	OA-16-00-SL	48/121	360-1600	5800	6.21E+02	Y	ASL
	78-59-1	Isophorone	200 J	200 J	ppb	OA-29-00-SL	1/121	360-1600	200	5.12E+05	N	BSL
	91-20-3	Naphthalene	25 J	100 J	ppb	OA-16-00-SL	12/121	360-1600	100	5.59E+04	N	BSL
	129-00-0	Pyrene	39 J	38000 E	ppb	OA-16-00-SL	70/121	360-1600	38000	2.32E+06	N	BSL
	11097-69-1	Aroclor-1254 (PCB-1254)	21 J	540 J	ppb	RR-01-00-SL	15/121	36-200	540	2.22E+02	Y	ASL
	11096-82-5	Aroclor-1260 (PCB-1260)	3.6 J	560	ppb	LF-01-00-SL	27/121	36-200	560	2.22E+02	Y	ASL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.

(2) Maximum concentration used for screening

(3) Region IX PRGs; PRG for Aroclor-1254 is used for Aroclor-1260.

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2. SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (4)	COPC Flag (Y/N)	Rationale for Selection or Deletion (5)
Subsurface Soil	95-48-7	2-Methylphenol	34 J	34 J	ppb	NB-32-33-SL	1/396	350-490	34	3.1E+06	N	BSL
	83-32-9	Acenaphthene	9.2 J	740	ppb	NB-55-13-SL	8/396	350-490	740	3.7E+06	N	BSL
	120-12-7	Anthracene	21 J	420	ppb	NB-55-13-SL	8/396	350-490	420	2.2E+07	N	BSL
	56-55-3	Benzo(a)anthracene	16 J	630	ppb	NB-53-33-SL	22/396	350-490	630	6.2E+02	Y	ASL
	50-32-8	Benzo(a)pyrene	23 J	780	ppb	NB-53-33-SL	17/396	350-490	780	6.2E+01	Y	ASL
	205-99-2	Benzo(b)fluoranthene	19 J	1800	ppb	NB-53-33-SL	23/396	350-490	1800	6.2E+02	Y	ASL
	207-08-9	Benzo(k)fluoranthene	31 J	620	ppb	NB-53-33-SL	13/396	350-490	620	6.2E+03	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	81 J	2,400	ppb	NB-56-05-SL	22/396	350-490	2,400	3.5E+04	N	BSL
	85-68-7	Butyl benzylphthalate	110 J	1500	ppb	BLD260-06-01	3/396	350-490	1500	1.2E+07	N	BSL
	218-01-9	Chrysene	18 J	1000	ppb	NB-53-33-SL	19/396	350-490	1000	6.2E+04	N	BSL
	84-74-2	Di-n-butylphthalate	280 J	280 J	ppb	BLD260-06-01	1/396	350-490	280	6.1E+06	N	BSL
	117-84-0	Di-n-octyl phthalate	93 J	93 J	ppb	PL-05-05-SL	1/396	350-490	93	2.4E+06	N	BSL
	206-44-0	Fluoranthene	17 J	3500	ppb	NB-55-13-SL	28/396	350-490	3500	2.3E+06	N	BSL
	86-73-7	Fluorene	25 J	500	ppb	NB-55-13-SL	5/396	350-490	500	2.7E+06	N	BSL
	67-72-1	Hexachloroethane	25 J	430 J	ppb	BLD253-02-21	5/396	350-490	430	3.5E+04	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	63 J	360 J	ppb	NB-53-33-SL	5/396	350-490	360	6.2E+02	N	BSL
	91-20-3	Naphthalene	19 J	19 J	ppb	NB-53-33-SL	1/396	350-490	19	5.6E+04	N	BSL
	129-00-0	Pyrene	43 J	7800 E	ppb	NB-56-05-SL	19/396	350-490	7800	2.3E+06	N	BSL
	11097-69-1	Aroclor-1254 (PCB-1254)	22 J	67	ppb	LF-09-03-SL	2/396	35-49	67	2.2E+02	N	BSL
	11096-82-5	Aroclor-1260 (PCB-1260)	4.2 J	5.8 J	ppb	EP-18-09-SL-FD	3/396	35-49	5.8	2.2E+02	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.

(2) Maximum concentration used for screening

(3) Region IX PRGs; PRG for Aroclor-1254 is used for Aroclor-1260.

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.10 Pesticides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Surface Soil	72-54-8	4,4'-DDD	0.46 J	2.5	ppb	BD-10-00-SL	2/121	1.8-2.7	2.5	2.44E+03	N	BSL
	72-55-9	4,4'-DDE	0.32 J	4.7 J	ppb	OA-01-00-SL	5/121	1.8-2.7	5	1.72E+03	N	BSL
	50-29-3	4,4'-DDT	1.4 J	25	ppb	EP-04-00-SL-FD	13/121	1.8-2.7	25	1.72E+03	N	BSL
	319-84-6	alpha-BHC	31	35 E	ppb	EP-04-00-SL-FD	2/121	1.8-2.7	35	9.02E+01	N	BSL
	60-57-1	Dieldrin	1.4 J	7	ppb	BD-10-00-SL	3/121	1.8-2.7	7	3.04E+01	N	BSL
	959-98-8	Endosulfan I	0.79 J	1.1 J	ppb	EP-04-00-SL-FD	2/121	1.8-2.7	1	3.67E+05	N	BSL
	33213-65-9	Endosulfan II	0.16 J	4.2	ppb	NB-22-00-SL	7/121	1.8-2.7	4.2	3.67E+05	N	BSL
	72-20-8	Endrin	0.3 J	21 J	ppb	RR-01-00-SL	11/121	1.8-2.7	21	1.83E+04	N	BSL
	76-44-8	Heptachlor	11	13	ppb	EP-04-00-SL-FD	2/121	1.8-2.7	13	1.08E+02	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.

(2) Maximum concentration used for screening

(3) Region IX PRGs

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.11 Pesticides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)
Subsurface Soil	72-55-9	4,4'-DDE	3	3	ppb	NB-55-13-SL	1/396	1.8-2.5	3	1.7E+03	N	BSL
	50-29-3	4,4'-DDT	0.73 J	1.1 J	ppb	BLD253-02-21	2/396	1.8-2.5	1.1	1.7E+03	N	BSL
	319-84-6	alpha-BHC	0.12 J	1.3 J	ppb	EP-17-30-SL	5/396	1.8-2.5	1.3	9.0E+01	N	BSL
	33213-65-9	Endosulfan II	0.8 J	0.8 J	ppb	LF-09-03-SL	1/396	1.8-2.5	0.8	3.7E+05	N	BSL
	72-20-8	Endrin	0.65 J	0.65 J	ppb	LF-08-03-SL	1/396	1.8-2.5	0.65	1.8E+04	N	BSL
	58-89-9	gamma-BHC (Lindane)	0.2 J	0.23 J	ppb	NB-55-13-SL	2/396	1.8-2.5	0.23	4.4E+02	N	BSL

Footnote Instructions:

(1) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(2) Maximum concentration used for screening

(3) Region IX PRGs

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.12 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)(5)
Groundwater	7429-90-5	Aluminum	0.11	16	ppm	GW-WS23-121304	60/115	0.1	16	3.6E+01	N	BSL
	7440-38-2	Arsenic	0.01	0.13	ppm	GW-WS23-121304	13/115	0.01	0.13	4.5E-05	Y	ASL
	7440-38-2	Arsenic (Dissolved)	0.062	0.062	ppm	GW-BR1RB-120704	1/17	0.01	0.062	4.5E-05	Y	ASL
	7440-39-3	Barium	0.027	1.2	ppm	GW-BD2-121604	115/115	0.012	1.2	2.6E+00	N	BSL
	7440-39-3	Barium (Dissolved)	0.068	0.54	ppm	GW-BR1JC-120604	17/17	0.012	0.54	2.6E+00	N	BSL
	7440-43-9	Cadmium	0.0035	0.0035	ppm	GW-BD2-121604	1/115	0.002	0.0035	1.8E-02	N	BSL
	NA	Chloride	0.88	430	ppm	GW-BD2-121604	113/115	0.2-10	430	2.5E+02	Y	ASL
	7440-47-3	Chromium Total	0.0059 =	0.037	ppm	GW-WS23-121304	10/115	0.004	0.037	1.1E-01	N	BSL
	7440-48-4	Cobalt	0.002 =	0.0042	ppm	GW-BD3-121704	28/115	0.002	0.0042	7.3E-01	N	BSL
	7440-48-4	Cobalt (Dissolved)	0.0024	0.0055 =	ppm	GW-BR9JC-121404	5/17	0.002	0.0055	7.3E-01	N	BSL
	7440-50-8	Copper	0.019	0.039	ppm	GW-BD2-121604	6/115	0.01	0.039	1.5E+00	N	BSL
	7439-89-6	Iron	0.11	38	ppm	GW-BD2-121604	92/115	0.1	38	1.1E+01	Y	ASL
	7439-89-6	Iron (Dissolved)	0.17	20	ppm	GW-NB61-122204	10/17	0.1	20	1.1E+01	Y	ASL
	7439-92-1	Lead	0.0032	0.059	ppm	GW-WS23-121304	18/115	0.003-0.006	0.059	1.5E-02	Y	ASL
	7439-96-5	Manganese	0.0014	13	ppm	GW-BD2-121604	110/115	0.001-0.002	13	8.8E-01	Y	ASL
	7439-96-5	Manganese (Dissolved)	0.0044	3.2	ppm	GW-BP22A-122804	17/17	0.001	3.2	8.8E-01	Y	ASL
	7440-02-0	Nickel	0.005	0.15	ppm	GW-BD8-122804	53/115	0.005	0.15	7.3E-01	N	BSL
	7440-02-0	Nickel (Dissolved)	0.0055	0.048	ppm	GW-EP20-121504	7/17	0.005	0.048	7.3E-01	N	BSL
	NA	Nitrate (as N)	0.22	290	ppm	GW-BD2-121604	42/115	10-0.2	290	1.0E+01	Y	ASL
	7782-49-2	Selenium	0.0051	0.0095	ppm	GW-NB78-122104	8/115	0.005	0.0095	1.8E-01	N	BSL
	NA	Sulfate	1.5	170	ppm	GW-WS26-121504	114/115	1-5	170	2.5E+02	N	BSL
	7440-28-0	Thallium	0.011	0.026	ppm	GW-BD2-121604	3/115	0.01-0.02	0.026	2.4E-03	Y	ASL
	7440-62-2	Vanadium	0.018	0.004	ppm	GW-WS23-121304	6/115	0.01	0.004	3.6E-02	N	BSL
	7440-66-6	Zinc	0.0067	0.65	ppm	GW-BD13-122804	81/115	0.006	0.65	1.1E+01	N	BSL
	7440-66-6	Zinc (Dissolved)	0.0085	0.026	ppm	GW-BR6OB-120704	8/17	0.006	0.026	1.1E+01	N	BSL

Footnote Instructions:

(1) = : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water, PRG for Chromium IV used for screening Chromium Total concentrations. MCL used for screening Lead.

(4) BSL = Below Screening Level; ASL = Above Screening Level

(5) All radioactive isotopes, including the contribtion from background, were included in the baseline risk assesment. No isotopes were omitted by the screening process.

TABLE 2.13 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)(5)
Surface Water	7429-90-5	Aluminum	0.1	19	ppm	SW-01-SW	10/13	0.1	19	3.6E+01	*0.05*	SMCL	N	BSL
	7440-38-2	Arsenic	0.011	0.011	ppm	SW-01-SW	1/13	0.01	0.011	4.5E-05	0.01	MCL	Y	ASL
	7440-39-3	Barium	0.069	0.63	ppm	SW-01-SW	13/13	0.012	0.63	2.6E+00	2	MCL	N	BSL
	7440-47-3	Chromium Total	0.026	0.026	ppm	SW-01-SW	1/13	0.004	0.026	1.1E-01	0.1	MCL	N	BSL
	7440-48-4	Cobalt	0.017	0.017	ppm	SW-01-SW	1/13	0.002	0.017	7.3E-01			N	BSL
	7440-50-8	Copper	0.055	0.055	ppm	SW-01-SW	1/13	0.001	0.055	1.5E+00	**1.3**	MCL	N	BSL
	NA	Fluoride	0.67	0.67	ppm	SW-09-SW	1/13	0.5	0.67	2.2E+00	4	MCL	N	BSL
	7439-89-6	Iron	0.11	23	ppm	SW-01-SW	9/13	0.1	23	1.1E+01	*0.3*	SMCL	Y	ASL
	7439-92-1	Lead	0.068	0.068	ppm	SW-01-SW	1/13	0.003	0.068	1.5E-02	**0.015**	MCL	Y	ASL
	7439-96-5	Manganese	0.015	1.3	ppm	SW-01-SW	13/13	0.001	1.3	8.8E-01	*0.05*	SMCL	Y	ASL
	7440-02-0	Nickel	0.031	0.031	ppm	SW-01-SW	1/13	0.005	0.031	7.3E-01			N	BSL
	7440-62-2	Vanadium	0.045	0.045	ppm	SW-01-SW	1/13	0.01	0.045	3.6E-02			Y	ASL

Footnote Instructions:

(1) NA

(2) Maximum concentration used for screening

(3) Region IX PRGs for tap water, PRG for Chromium IV used for screening Chromium Total concentrations. MCL used for screening Lead.

(4) BSL = Below Screening Level; ASL = Above Screening Level

(5) All radioactive isotopes, including the contribtion from background, were included in the baseline risk assesment. No isotopes were omitted by the screening process.

TABLE 2.14 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)(5)
Surface Soil	7429-90-5	Aluminum	2000	24000 J	ppm	SW-01-00-SL	121/121	11-16	24000	7.6E+04	N	BSL
	7440-36-0	Antimony	0.94	21	ppm	BD-10-00-SL	30/121	0.87-1.3	21	3.1E+01	N	BSL
	7440-38-2	Arsenic	1.1	160	ppm	EP-06-00-SL	121/121	0.76-1.2	160	3.9E-01	Y	ASL
	7440-39-3	Barium	24	1500	ppm	NB-04-00-SL	121/121	0.54-1.2	1500	5.4E+03	N	BSL
	7440-41-7	Beryllium	0.35	5.8	ppm	EP-04-00-SL	113/121	0.33-0.49	5.8	1.5E+02	N	BSL
	7440-43-9	Cadmium	0.23	11	ppm	EP-02-00-SL	78/121	0.22-1.2	11	3.7E+01	N	BSL
	7440-47-3	Chromium Total	4.9	280	ppm	BD-10-00-SL	121/121	0.43-0.66	280	2.1E+02	Y	ASL
	7440-48-4	Cobalt	0.86	300	ppm	OA-23-00-SL	121/121	0.22-0.48	300	9.0E+02	N	BSL
	7440-50-8	Copper	5.6	1800	ppm	EP-02-00-SL	121/121	0.87-2.2	1800	3.1E+03	N	BSL
	NA	Fluoride	6.6 =	170	ppm	OA-25-00-SL	98/121	5.4-8.2	170	3.7E+03	N	BSL
	7439-89-6	Iron	1600	61000	ppm	BD-10-00-SL	121/121	11-59	61000	2.3E+04	Y	ASL
	7439-92-1	Lead	3.7	1400	ppm	OA-13-00-SL	121/121	0.35-3.9	1400	4.0E+02	Y	ASL
	7439-96-5	Manganese	41	4400 J	ppm	SW-02-00-SL	121/121	0.22-1.4	4400	1.8E+03	Y	ASL
	7439-97-6	Mercury	0.024	3.4	ppm	EP-01-00-SL	98/121	0.022-0.27	3.4	2.3E+01	N	BSL
	7440-02-0	Nickel	5.3	300	ppm	BD-10-00-SL	121/121	0.54-0.82	300	1.6E+03	N	BSL
	7782-49-2	Selenium	0.61	4.1	ppm	EP-10-00-SL	81/121	0.54-2.9	4.1	3.9E+02	N	BSL
	7440-22-4	Silver	0.57	2	ppm	EP-02-00-SL	9/121	0.54-0.82	2	3.9E+02	N	BSL
	7440-28-0	Thallium	1 =	2.2 =	ppm	OA-03-00-SL	8/121	0.87-5.4	2.2	5.2E+00	N	BSL
	7440-62-2	Vanadium	5.4	45	ppm	SW-01-00-SL	121/121	0.54-0.82	45	7.8E+01	N	BSL
	7440-66-6	Zinc	19	1500	ppm	EP-04-00-SL-FD	121/121	0.65-1.5	1500	2.3E+04	N	BSL

Footnote Instructions:

(1) J: This flag indicates an estimated value.
= : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(2) Maximum concentration used for screening

(3) Region IX PRGs

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.15 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 1
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte	Minimum Concentration (Qualifier) (1)	Maximum Concentration (Qualifier) (1)	Units	Location of Maximum Concentration	Detection Frequency	Range of Reporting Limits	Concentration Used for Screening (2)	Screening Toxicity Value (N/C) (3)	COPC Flag (Y/N)	Rationale for Selection or Deletion (4)(5)
Subsurface Soil	7429-90-5	Aluminum	680	28000	ppm	BLD253-02-21FD	428/428	11-15	28000	7.6E+04	N	BSL
	7440-36-0	Antimony	1	1.8	ppm	NB-39-15-SL	13/428	0.85-1.2	1.8	3.1E+01	N	BSL
	7440-38-2	Arsenic	1.1	24	ppm	BP-18-25-SL	428/428	0.74-1	24	3.9E-01	Y	ASL
	7440-39-3	Barium	9.6	790	ppm	NB-37-15-SL	428/428	0.53-0.74	790	5.4E+03	N	BSL
	7440-41-7	Beryllium	0.35	2.8	ppm	SW-02-01-SL	375/428	0.32-0.44	2.8	1.5E+02	N	BSL
	7440-43-9	Cadmium	0.22	4.7	ppm	SW-02-01-SL	70/428	0.21-0.59	4.7	3.7E+01	N	BSL
	7440-47-3	Chromium Total	5.8	49	ppm	BLD240-05-01	428/428	0.43-0.59	49	2.1E+02	N	BSL
	7440-48-4	Cobalt	1.2	54	ppm	NB-36-15-SL	428/428	0.21-0.29	54	9.0E+02	N	BSL
	7440-50-8	Copper	1.5	38	ppm	BLD240-05-23	428/428	0.85-1.2	38	3.1E+03	N	BSL
	NA	Fluoride	6.3	200	ppm	LS-02-00-SL	70/405	5.3-7.4	200	3.7E+03	N	BSL
	7439-89-6	Iron	2100	35000	ppm	BD-15-17-SL	428/428	11-29	35000	2.3E+04	Y	ASL
	7439-92-1	Lead	3.8	680	ppm	NB-75-19-SL	428/428	0.32-3.4	680	4.0E+02	Y	ASL
	7439-96-5	Manganese	20 =	5700	ppm	NB-37-15-SL	428/428	0.21-1.3	5700	1.8E+03	Y	ASL
	7439-97-6	Mercury	0.02	0.54	ppm	SW-02-01-SL	117/428	0.013-0.03	0.54	2.3E+01	N	BSL
	7440-02-0	Nickel	2.7	97	ppm	NB-85-25-SL	428/428	0.53-0.74	97	1.6E+03	N	BSL
	7782-49-2	Selenium	0.55	2.9	ppm	NB-47-31-SL	244/428	0.53-1.5	2.9	3.9E+02	N	BSL
	7440-22-4	Silver	0.85	0.85	ppm	SW-02-01-SL	1/428	0.53-0.74	0.85	3.9E+02	N	BSL
	7440-28-0	Thallium	0.98	2.6	ppm	BD-16-19-SL	82/428	0.85-5.4	2.6	5.2E+00	N	BSL
	7440-62-2	Vanadium	8	56	ppm	BLD253-02-21	428/428	0.53-0.74	56	7.8E+01	N	BSL
	7440-66-6	Zinc	18	850	ppm	NB-63-05-SL	428/428	0.64-0.88	850	2.3E+04	N	BSL

Footnote Instructions:

(1) = : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(2) Maximum concentration used for screening

(3) Region IX PRGs

(4) BSL = Below Screening Level; ASL = Above Screening Level

TABLE 2.16 VOCs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as CCOC (Y/N)
Groundwater	79-00-5	1,1,2-Trichloroethane	1.4 J	8	ppb	GW-NB80-121704	5/138	8	Y	N	N
	75-35-4	1,1-Dichloroethene	0.7 J	5100 J	ppb	GW-BD2-121604	60/138	5100	N	N	Y
	107-06-2	1,2-Dichloroethane	1.1 J	9	ppb	GW-BD8-122804	9/138	9	Y	N	N
	71-43-2	Benzene	1.3 J	4.8 J	ppb	GW-BD6-121404	2/138	4.8	Y	N	N
	75-00-3	Chloroethane	3 J	71	ppb	BP-21-25-35-OL-GW-SS	6/138	71	Y	N	N
	67-66-3	Chloroform (Trichloromethane)	1.1 J	6.8 =	ppb	GW-BD6-121404	5/138	6.8	Y	N	N
	156-59-2	cis-1,2-Dichloroethene	1 J	1900 =	ppb	GW-BD6-121404	75/138	1900	N	N	Y
	75-09-2	Methylene chloride	1.8 J	1600	ppb	GW-FD7-122004	24/138	1600	N	N	Y
	127-18-4	Tetrachloroethene	1.4 J	200000	ppb	GW-BD2-121604	79/138	200000	N	N	Y
	156-60-5	trans-1,2-Dichloroethene	1 J	700 E	ppb	GW-BD13-122804	22/138	700	N	N	Y
	79-01-6	Trichloroethene	1.2 J	18000 =	ppb	GW-BD6-121404	81/138	18000	N	N	Y
	75-01-4	Vinyl chloride	0.68 J	1000 E	ppb	GW-BD6-121404	29/138	1000	N	N	Y

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.19)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.
= : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(3) Maximum concentration used for screening

TABLE 2.17 VOCs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Subsurface Soil	127-18-4	Tetrachloroethene	1.1 J	6600000	ppb	BLD253-02-21	127/428	6600000	N	N	Y
	79-01-6	Trichloroethene	1.2 J	1600	ppb	BLD255-08-24	98/428	1600	N	N	Y

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(3) Maximum concentration used for screening

TABLE 2.18 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Groundwater	117-81-7	bis(2-Ethylhexyl)phthalate	4 J	26	ppb	GW-LF08-122104	8/42	26	N	N	Y
	108-95-2	Phenol	2.1 J	9.8 J	ppb	GW-BD7-121504	2/42	9.8	Y	N	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(3) Maximum concentration used for screening

TABLE 2.19 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Surface Soil	56-55-3	Benzo(a)anthracene	18 J	6400	ppb	BD-10-00-SL	82/121	6400	N	N	Y
	50-32-8	Benzo(a)pyrene	16 J	6600	ppb	BD-10-00-SL	81/121	6600	N	N	Y
	205-99-2	Benzo(b)fluoranthene	20 J	7800	ppb	BD-10-00-SL	87/121	7,800	N	N	Y
	53-70-3	Dibenz(a,h)anthracene	35 J	440	ppb	OA-15-00-SL	3/121	440	Y	N	N
	193-39-5	Indeno(1,2,3-cd)pyrene	29 J	5800 E	ppb	OA-16-00-SL	48/121	5800	N	N	Y
	11097-69-1	Aroclor-1254 (PCB-1254)	21 J	540 J	ppb	RR-01-00-SL	15/121	540	N	N	Y
	11096-82-5	Aroclor-1260 (PCB-1260)	3.6 J	560	ppb	LF-01-00-SL	27/121	560	N	N	Y

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.
E: This flag identifies compounds whose concentration exceeds the upper level of the calibration range.

(3) Maximum concentration used for screening

TABLE 2.20 SVOCs & PCBs
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N) (4)
Subsurface Soil	56-55-3	Benzo(a)anthracene	16 J	630	ppb	NB-53-33-SL	22/396	630	N	N	N
	50-32-8	Benzo(a)pyrene	23 J	780	ppb	NB-53-33-SL	17/396	780	Y	N	N
	205-99-2	Benzo(b)fluoranthene	19 J	1800	ppb	NB-53-33-SL	23/396	1800	N	N	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(3) Maximum concentration used for screening

(4) Benzo(a)anthracene and Benzo(b)fluoranthene were not retained as COPCs due to there low frequency of detection, which was approaching 5%.

TABLE 2.21 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Groundwater	7440-38-2	Arsenic	0.01	0.13	ppm	GW-WS23-121304	13/115	0.13	N	N	Y
	7440-38-2	Arsenic (Dissolved)	0.062	0.062	ppm	GW-BR1RB-120704	1/17	0.062	N	N	Y
	NA	Chloride	0.88	430	ppm	GW-BD2-121604	113/115	430	N	Y	N
	7439-89-6	Iron	0.11	38	ppm	GW-BD2-121604	92/115	38	N	Y	N
	7439-89-6	Iron (Dissolved)	0.17	20	ppm	GW-NB61-122204	10/17	20	N	Y	N
	7439-92-1	Lead	0.0032	0.059	ppm	GW-WS23-121304	18/115	0.059	N	N	Y
	7439-96-5	Manganese	0.0014	13	ppm	GW-BD2-121604	110/115	13	N	Y	N
	7439-96-5	Manganese (Dissolved)	0.0044	3.2	ppm	GW-BP22A-122804	17/17	3.2	N	Y	N
	NA	Nitrate (as N)	0.22	290	ppm	GW-BD2-121604	42/115	290	N	N	N
	7440-28-0	Thallium	0.011	0.026	ppm	GW-BD2-121604	3/115	0.026	Y	N	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) NA

(3) Maximum concentration used for screening

TABLE 2.22 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Surface Water	7440-38-2	Arsenic	0.011	0.011	ppm	SW-01-SW	1/13	0.011	N	N	Y
	7439-89-6	Iron	0.11	23	ppm	SW-01-SW	9/13	23	N	Y	N
	7439-92-1	Lead	0.068	0.068	ppm	SW-01-SW	1/13	0.068	N	N	Y
	7439-96-5	Manganese	0.015	1.3	ppm	SW-01-SW	13/13	1.3	N	Y	N
	7440-62-2	Vanadium	0.045	0.045	ppm	SW-01-SW	1/13	0.045	N	N	Y
	7440-66-6	Zinc	0.012	0.35	ppm	SW-01-SW	3/13	0.35	N	Y	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) NA

(3) Maximum concentration used for screening

TABLE 2.23 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Surface Soil	7440-38-2	Arsenic	1.1	160	ppm	EP-06-00-SL	121/121	160	N	N	Y
	7440-47-3	Chromium Total	4.9	280	ppm	BD-10-00-SL	121/121	280	N	N	Y
	7439-89-6	Iron	1600	61000	ppm	BD-10-00-SL	121/121	61000	N	Y	N
	7439-92-1	Lead	3.7	1400	ppm	OA-13-00-SL	121/121	1400	N	N	Y
	7439-96-5	Manganese	41	4400 J	ppm	SW-02-00-SL	121/121	4400	N	Y	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) J: Indicates that the compound was positively identified. The associated numerical value is the approximate concentration of the compound in the sample.

(3) Maximum concentration used for screening

TABLE 2.24 Inorganics/Radionuclides
SELECTION OF CONSTITUENTS OF POTENTIAL CONCERN - SCREEN 2
Westinghouse Electric Co. Hematite Site

Scenario Timeframe: Current/Future

Medium	CAS Number	Analyte (1)	Minimum Concentration (Qualifier) (2)	Maximum Concentration (Qualifier) (2)	Units	Location of Maximum Concentration	Detection Frequency	Concentration Used for Screening (3)	Frequency (<5%) (Y/N)	Essential Nutrient (Y/N)	Selected as COPC (Y/N)
Subsurface Soil	7440-38-2	Arsenic	1.1	24	ppm	BP-18-25-SL	428/428	24	N	N	Y
	7439-89-6	Iron	2100	35000	ppm	BD-15-17-SL	428/428	35000	N	Y	N
	7439-92-1	Lead	3.8	680	ppm	NB-75-19-SL	428/428	680	N	N	Y
	7439-96-5	Manganese	20 =	5700	ppm	NB-37-15-SL	428/428	5700	N	Y	N

Footnote Instructions:

(1) Chemical listed exceeded screening levels (Table 2.2-2.16)

(2) = : Indicates that the value has been validated and that the compound has been positively identified and the associated concentration value is accurate.

(3) Maximum concentration used for screening

TABLE 3.1
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 1, Overburden Wells

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Groundwater	1,1-Dichloroethene	ppb	790	6.7E+01	92	50	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	1.64E+02
	cis-1,2-Dichloroethene	ppb	19000	4.3E+02	92	38	99% Chebyshev (Mean, Sd) UCL	Non-parametric	2.57E+03
	Methylene chloride	ppb	1600	5.3E+01	92	79	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	1.93E+02
	Tetrachloroethene	ppb	14000	7.1E+02	92	34	99% Chebyshev (Mean, Sd) UCL	Non-parametric	2.93E+03
	trans-1,2-Dichloroethene	ppb	700	4.3E+01	92	76	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	1.24E+02
	Trichloroethene	ppb	18000	7.4E+02	92	34	99% Chebyshev (Mean, Sd) UCL	Non-parametric	3.32E+03
	Vinyl chloride	ppb	1250	7.8E+01	92	76	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	2.29E+02
	Arsenic	ppm	0.13	7.9E-03	89	81	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.47E-02
	Lead	ppm	0.059	4.0E-03	89	72	95% Chebyshev (Mean, Sd) UCL	Non-parametric	8.01E-03
	Bis(2-ethylhexyl)phthalate	ppb	26	6.0E+00	39	33	Student's-t UCL	Normal	7.12E+00
	Radium 226	pCi/l	2.22	5.7E-01	11	4	Approximate Gamma UCL	Gamma	1.01E+00
	Neptunium 237	pCi/l	0.018	2.2E-03	25	24	Student's-t UCL	Normal	4.36E-03
	Plutonium 239	pCi/l	0.018	2.0E-03	25	25	Student's-t UCL	Normal	4.38E-03
	Uranium 238	pCi/l	56.3	1.4E+00	92	58	H-UCL	Lognormal	1.39E+00
	Uranium 235	pCi/l	0.19	3.2E-02	92	62	95% Chebyshev (Mean, Sd) UCL	Non-parametric	5.04E-02
	Uranium 234	pCi/l	4.81	3.8E-01	92	46	99% Chebyshev (Mean, Sd) UCL	Non-parametric	1.64E+00
	Thorium 232	pCi/l	0.241	3.6E-02	92	84	95% Chebyshev (Mean, Sd) UCL	Non-parametric	5.55E-02
	Thorium 230	pCi/l	0.306	1.8E-02	92	91	95% Chebyshev (Mean, Sd) UCL	Non-parametric	4.75E-02
	Technetium 99	pCi/l	5100	1.5E+02	92	66	95% Chebyshev (Mean, Sd) UCL	Non-parametric	4.53E+02

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.

(2) As determined or calculated by PROUCL Version 3.1
(3) Radioactive isotopes include the contribution from background

TABLE 3.2
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 2, Bedrock Wells

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Groundwater	1,1-Dichloroethene	ppb	210	2.2E+01	39	26	99% Chebyshev (Mean, Sd) UCL	Non-parametric	9.67E+01
	cis-1,2-Dichloroethene	ppb	2400	2.5E+02	39	24	99% Chebyshev (Mean, Sd) UCL	Non-parametric	1.21E+03
	Methylene chloride	ppb	125	1.5E+01	39	35	99% Chebyshev (Mean, Sd) UCL	Non-parametric	6.72E+01
	Tetrachloroethene	ppb	2200	2.0E+02	39	25	99% Chebyshev (Mean, Sd) UCL	Non-parametric	1.04E+03
	trans-1,2-Dichloroethene	ppb	125	1.6E+01	39	36	99% Chebyshev (Mean, Sd) UCL	Non-parametric	6.78E+01
	Trichloroethene	ppb	5800	5.2E+02	39	22	99% Chebyshev (Mean, Sd) UCL	Non-parametric	2.48E+03
	Vinyl chloride	ppb	250	2.9E+01	39	31	99% Chebyshev (Mean, Sd) UCL	Non-parametric	1.20E+02
	Arsenic	ppm	0.046	8.1E-03	25	21	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.60E-02
	Neptunium 237	pCi/l	0.006	1.3E-04	7	7	Student's t UCL	Normal	4.25E-03
	Plutonium 239	pCi/l	0.018	6.5E-03	7	7	Student's t UCL	Normal	1.24E-02
	Radium 226	pCi/l	1.62	1.0E+00	5	2	Student's t UCL	Normal	1.66E+00
	Uranium 238	pCi/l	1.43	5.7E-01	23	2	Student's t UCL	Normal	7.05E-01
	Uranium 235	pCi/l	0.0986	4.7E-02	23	18	Student's t UCL	Normal	5.72E-02
	Uranium 234	pCi/l	12.5	5.0E+00	23	14	Student's t UCL	Normal	6.91E+00
	Thorium 232	pCi/l	0.119	2.4E-02	23	18	Approximate Gamma UCL	Gamma	3.58E-02
	Thorium 230	pCi/l	0.113	1.3E-02	23	22	Student's t UCL	Normal	3.17E-02
	Technetium 99	pCi/l	8.96	3.6E+00	23	23	Student's t UCL	Normal	4.47E+00

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.

(2) As determined or calculated by PROUCL Version 3.1
(3) Radioactive isotopes include the contribution from background

TABLE 3.3
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 3, Surface Water

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Surface Water	Arsenic	ppm	0.011	5.5E-03	13	12	Student's-t UCL	Non-parametric	6.28E-03
	Lead	ppm	0.068	6.6E-03	13	12	99% Chebyshev (Mean, Sd) UCL	Non-parametric	5.75E-02
	Vanadium	ppm	0.045	8.1E-03	13	12	95% Chebyshev (Mean, Sd) UCL	Non-parametric	2.15E-02
	Tetrachloroethene	ppb	2.5	2.2E+00	13	10	Student's-t UCL	Normal	2.52E+00
	Trichloroethene	ppb	2.5	2.2E+00	13	11	Student's-t UCL	Normal	2.56E+00
	Uranium 238	pCi/l	4.77	7.1E-01	13	0	95% Chebyshev (Mean, Sd) UCL	Non-parametric	2.21E+00
	Uranium 235	pCi/l	0.14	5.3E-02	13	6	Student's-t UCL	Normal	7.20E-02
	Uranium 234	pCi/l	1.49		1	0	Insufficient Number of Samples		
	Thorium 232	pCi/l	0.0293	1.5E-02	13	13	Student's-t UCL	Normal	1.87E-02
	Thorium 230	pCi/l	0.0451	2.0E-02	13	13	95% Chebyshev (Mean, Sd) UCL	Non-parametric	3.58E-02
	Technetium 99	pCi/l	3.16	1.1E+00	13	13	Student's-t UCL	Normal	1.63E+00

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.

(2) As determined or calculated by PROUCL Version 3.0
(3) Radioactive isotopes include the contribution from background

TABLE 3.4
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 4, Surface soil

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Surface Soil	Arsenic	ppm	160	1.4E+01	121	0	95% Chebyshev (Mean, Sd) UCL	Non-parametric	2.25E+01
	Chromium Total	ppm	280	2.0E+01	121	0	95% Chebyshev (Mean, Sd) UCL	Non-parametric	3.07E+01
	Lead	ppm	1400	9.2E+01	121	0	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.54E+02
	Benzo(a)anthracene	ppb	6400	3.44E+02	121	39	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	8.53E+02
	Benzo(a)pyrene	ppb	6600	3.73E+02	121	40	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	9.15E+02
	Benzo(b)fluoranthene	ppb	7,800	5.14E+02	121	34	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	1.26E+03
	Indeno(1,2,3-cd)pyrene	ppb	5800	3.91E+02	121	73	95% Chebyshev (Mean, Sd) UCL	Non-parametric	7.55E+02
	Aroclor-1254 (PCB-1254)	ppb	540	3.55E+01	121	106	95% Chebyshev (Mean, Sd) UCL	Non-parametric	5.79E+01
	Aroclor-1260 (PCB-1260)	ppb	560	4.03E+01	121	94	95% Chebyshev (Mean, Sd) UCL	Non-parametric	7.07E+01
	Neptunium 237	pCi/g	2610	5.56E+01	121	101	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.66E+02
	Plutonium 239	pCi/g	0.033	7.60E-03	30	23	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.37E-02
	Radium 226	pCi/g	1.71	8.56E-01	121	15	Student's t UCL	Normal	8.98E-01
	Uranium 238	pCi/g	705	4.1E+01	121	65	95% Chebyshev (Mean, Sd) UCL	Non-parametric	9.02E+01
	Uranium 235	pCi/g	308	1.4E+01	121	78	95% Chebyshev (Mean, Sd) UCL	Non-parametric	3.20E+01
	Thorium 232	pCi/g	36.4	1.5E+00	121	37	95% Chebyshev (Mean, Sd) UCL	Non-parametric	3.22E+00
	Technetium 99	pCi/g	17100	2.1E+02	121	56	95% Chebyshev (Mean, Sd) UCL	Non-parametric	8.34E+02

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.
(2) As determined or calculated by PROUCL Version 3.0
(3) Radioactive isotopes include the contribution from background

TABLE 3.5
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 5, Subsurface soil

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Subsurface Soil	Tetrachloroethene	ppb	6700	1.1E+02	394	269	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	3.26E+02
	Trichloroethene	ppb	1600	2.1E+01	394	297	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	6.08E+01
	Arsenic	ppm	24	6.5E+00	394	0	Student's-t UCL	Normal	6.70E+00
	Lead	ppm	680	2.3E+01	394	0	Student's-t UCL	Normal	2.56E+01
	Neptunium 237	pCi/g	0.353	-1.45E+00	394	393	95% Chebyshev (Mean, Sd) UCL	Non-parametric	-4.85E-01
	Plutonium 239	pCi/g	0.008	2.24E-03	28	24	Student's t UCL	Normal	3.23E-03
	Radium 226	pCi/g	1.53	6.65E-01	394	49	95% Chebyshev (Mean, Sd) UCL	Non-parametric	7.29E-01
	Uranium 238	pCi/g	71	1.3E+00	394	90	95% Chebyshev (Mean, Sd) UCL	Non-parametric	2.17E+00
	Uranium 235	pCi/g	23.1	4.1E-01	394	379	95% Chebyshev (Mean, Sd) UCL	Non-parametric	8.46E-01
	Thorium 230	pCi/g	1.74	1.1E+00	18	0	Student's-t UCL	Normal	1.25E+00
	Thorium 232	pCi/g	2.38	8.5E-01	394	218	95% Chebyshev (Mean, Sd) UCL	Non-parametric	9.43E-01
	Technetium 99	pCi/g	131	2.0E+00	394	380	95% Chebyshev (Mean, Sd) UCL	Non-parametric	4.23E+00

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.

(2) As determined or calculated by PROUCL Version 3.0
(3) Radioactive isotopes include the contribution from background

TABLE 3.6
EXPOSURE POINT CONCENTRATION SUMMARY
Westinghouse Electric Co. Hematite Site

EPC Set: 6, Subsurface soil to depth of 15 feet

Medium	Constituent of Potential Concern (1)	Units	Max	Mean	Number of Samples	Number of Non-detects	95% UCL Method (2)	Distribution (2)	UCL (2)(3)
Subsurface Soil	Tetrachloroethene	ppb	5100	3.8E+01	219	163	97.5% Chebyshev (Mean, Sd) UCL	Non-parametric	1.86E+02
	Trichloroethene	ppb	34	3.8E+00	219	181	Student's-t UCL	Normal	4.20E+00
	Arsenic	ppm	17	6.8E+00	219	0	Student's-t UCL	Normal	7.00E+00
	Lead	ppm	120	2.4E+01	219	0	Student's-t UCL	Normal	2.57E+01
	Neptunium 237	pCi/g	0.353	-1.4E+00	219	213	95% Chebyshev (Mean, Sd) UCL	Non-parametric	-1.25E-02
	Plutonium 239	pCi/g	0.007	2.6E-03	23	19	Student's-t UCL	Normal	3.73E-03
	Uranium 238	pCi/g	71	1.7E+00	219	200	95% Chebyshev (Mean, Sd) UCL	Non-parametric	3.29E+00
	Uranium 235	pCi/g	23.1	6.2E-01	219	205	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.35E+00
	Uranium 234	pCi/g	604	2.6E+02	6	0	Student's-t UCL	Normal	4.88E+02
	Thorium 232	pCi/g	2.38	9.0E-01	219	103	95% Chebyshev (Mean, Sd) UCL	Non-parametric	1.02E+00
	Thorium 230	pCi/g	1.71	1.1E+00	13	0	Student's-t UCL	Normal	1.22E+00
	Technetium 99	pCi/g	30.2	1.3E+00	219	209	95% Chebyshev (Mean, Sd) UCL	Non-parametric	2.31E+00
	Radium 226	pCi/g	1.53	7.1E-01	219	40	95% Chebyshev (Mean, Sd) UCL	Non-parametric	7.93E-01

(1) COPCs not listed from Table 2.1 were not detected in the particular EPC set.

(2) As determined or calculated by PROUCL Version 3.0

(3) Radioactive isotopes include the contribution from background

TABLE 4.1 EXPOSURE FACTORS
Westinghouse Electric Co. Hematite Site

Parameter	Symbol	Unit	Exposure Value	Source
Averaging Time for Carcinogen	AT_c	days	25,550	EPA, 1989
Averaging Time for Non-Carcinogen	AT_{nc}	days	Exposure Duration	EPA, 1989
Body Weight:				
Resident Child	BW	kg	15	EPA, 1991
Resident Adult	BW	kg	70	EPA, 1991
Commercial/Industrial Worker	BW	kg	70	EPA, 1991
Construction Worker	BW	kg	70	EPA, 1991
Agricultural	BW	kg	70	EPA, 1991
Recreational Child	BW	kg	15	EPA, 1991
Recreational Adult	BW	kg	70	EPA, 1991
Visitor/Trespasser	BW	kg	70	EPA, 1991
Exposure Duration:				
Resident Child	ED	year	6	EPA, 1991
Resident Adult	ED	year	24	EPA, 2002 (Adult years only)
Commercial/Industrial Worker	ED	year	25	EPA, 1991
Construction Worker	ED	year	1	MRBCA
Agricultural	ED	year	30	EPA, 1991
Recreational Child	ED	year	6	EPA, 1991
Recreational Adult	ED	year	24	EPA, 1991
Visitor/Trespasser	ED	year	24	EPA, 1991
Exposure Time for Dermal Contact with Water:				
Resident Child (Bathing)	ET_w	hr/day	0.75	EPA, 1997 Table 1-2 (1 event/day)
Resident Adult (Showering)	ET_w	hr/day	0.583	EPA, 1997 Table 1-2 (1 event/day)
Resident Child (During other domestic use)	ET_w	hr/day	1	MRBCA (1 event/day)
Resident Adult (During other domestic use)	ET_w	hr/day	1	MRBCA (1 event/day)
Commercial/Industrial Worker (During workplace use)	ET_w	hr/day	1	MRBCA (1 event/day)
Construction Worker (Incidental contact)	ET_w	hr/day	1	MRBCA (1 event/day)
Exposure Frequency:				
Resident Child	EF	day/year	350	EPA, 1991
Resident Adult	EF	day/year	350	EPA, 1991
Commercial/Industrial Worker	EF	day/year	250	EPA, 2002
Construction Worker	EF	day/year	225	EPA, 2002
Agricultural	EF	day/year	225	EPA, 2002
Recreational Child	EF	day/year	195	VA DEQ
Recreational Adult	EF	day/year	195	VA DEQ
Visitor/Trespasser	EF	day/year	24	VA DEQ
Soil Ingestion Rate:				
Resident Child	IR_{soil}	mg/day	200	EPA, 1991
Resident Adult	IR_{soil}	mg/day	100	EPA, 1991
Commercial/Industrial Worker	IR_{soil}	mg/day	100	EPA, 1991
Construction Worker	IR_{soil}	mg/day	330	EPA, 2002
Agricultural	IR_{soil}	mg/day	200	EPA, 1991
Recreational Child	IR_{soil}	mg/day	200	EPA, 1991
Recreational Adult	IR_{soil}	mg/day	100	EPA, 1991
Visitor/Trespasser	IR_{soil}	mg/day	100	EPA, 1991
Groundwater Ingestion Rate:				
Resident Child	IR_w	L/day	1	EPA, 1991
Resident Adult	IR_w	L/day	2	EPA, 1991
Commercial/Industrial Worker	IR_w	L/day	1	EPA, 1991
Indoor Inhalation Rate (hourly):				
Resident Child	IR_{ai}	m^3/hr	0.3625	EPA, 1997 Table 1-2 (Children 1-12)
Resident Adult	IR_{ai}	m^3/hr	0.833	EPA, 1991
Commercial/Industrial Worker	IR_{ai}	m^3/hr	0.833	EPA, 1991
Exposure Time for Indoor Inhalation:				
Resident Child	ET_{in}	hr/day	16.4	EPA, 1991
Resident Adult	ET_{in}	hr/day	16.4	EPA, 1991
Commercial/Industrial Worker	ET_{in}	hr/day	8	EPA, 1991
Outdoor Inhalation Rate (hourly):				
Resident Child	IR_{ao}	m^3/hr	0.3625	EPA, 1997 Table 1-2 (Children 1-12)
Resident Adult	IR_{ao}	m^3/hr	0.833	EPA, 1991
Commercial/Industrial Worker	IR_{ao}	m^3/hr	0.833	EPA, 1991
Construction Worker	IR_{ao}	m^3/hr	1.5	EPA, 1997 Table 5-2 (Medium activity)
Agricultural	IR_{ao}	m^3/hr	1.5	EPA, 1997 Table 5-2 (Medium activity)
Recreational Child	IR_{ao}	m^3/hr	0.65	EPA, 1997 Table 5-6 (Young children, Light acitivity)
Recreational Adult	IR_{ao}	m^3/hr	1.39	EPA, 1997 Table 5-6 (Average of Female and Male, Light acitivity)
Visitor/Trespasser	IR_{ao}	m^3/hr	0.833	EPA, 1991
Exposure Time for Outdoor Inhalation:				
Resident Child	ET_{out}	hr/day	5.57	Weighted Avg. based on EPA, 1997 Table 1-2
Resident Adult	ET_{out}	hr/day	2	EPA, 1997 Table 1-2
Commercial/Industrial Worker	ET_{out}	hr/day	1.5	EPA, 1997 Table 1-2
Construction Worker	ET_{out}	hr/day	10	10-hour Workday
Agricultural	ET_{out}	hr/day	10	10-hour Workday
Recreational Child	ET_{out}	hr/day	0.17	Weighted Avg. based on EPA, 1997 Table 15-3 (Age 3-5, Sports and Outdoor Activities)
Recreational Adult	ET_{out}	hr/day	0.83	EPA, 1997 Table 15-5
Visitor/Trespasser	ET_{out}	hr/day	2	VA DEQ

TABLE 4.1 EXPOSURE FACTORS
Westinghouse Electric Co. Hematite Site

Parameter	Symbol	Unit	Exposure Value	Source
Skin Surface Area for Dermal Contact with Soil:				
Resident Child	SA_{soil}	cm^2/day	2800	EPA, 2004 (face, hands, forearms, lower legs, feet)
Resident Adult	SA_{soil}	cm^2/day	5700	EPA, 2004 (face, hands, forearms, lower legs, feet)
Commercial/Industrial Worker	SA_{soil}	cm^2/day	3300	EPA, 2004 (face, hands, forearms)
Construction Worker	SA_{soil}	cm^2/day	3300	EPA, 2004 (face, hands, forearms)
Agricultural	SA_{soil}	cm^2/day	3300	EPA, 2004 (face, hands, forearms) based on Const. Worker
Recreational Child	SA_{soil}	cm^2/day	2800	EPA, 2004 (face, hands, forearms, lower legs, feet)
Recreational Adult	SA_{soil}	cm^2/day	5700	EPA, 2004 (face, hands, forearms, lower legs, feet)
Visitor/Trespasser	SA_{soil}	cm^2/day	5700	EPA, 2004
Skin Surface Area for Dermal Contact with Water:				
Resident Child (Full Body)	SA_w	cm^2/day	6600	EPA, 2004
Resident Adult (Full Body)	SA_w	cm^2/day	18000	EPA, 2004
Resident Child (During other domestic use)	SA_w	cm^2/day	360	EPA, 2002 (Hands only)
Resident Adult (During other domestic use)	SA_w	cm^2/day	800	EPA, 2002 (Hands only)
Commercial/Industrial Worker (During workplace use)	SA_w	cm^2/day	800	EPA, 1997
Construction Worker (Incidental contact)	SA_w	cm^2/day	3300	EPA, 1997
Agricultural (Incidental contact)	SA_w	cm^2/day	3300	EPA, 1997
Recreational Child (Full Body)	SA_w	cm^2/day	6600	EPA, 2004
Recreational Adult (Full Body)	SA_w	cm^2/day	18000	EPA, 2004
Visitor/Trespasser (Full Body)	SA_w	cm^2/day	18000	EPA, 2004
Soil to Skin Adherence Factor:				
Resident Child	AF	mg/cm^2	0.2	EPA, 2004
Resident Adult	AF	mg/cm^2	0.07	EPA, 2004
Commercial/Industrial Worker	AF	mg/cm^2	0.2	EPA, 2004
Construction Worker	AF	mg/cm^2	0.3	EPA, 2002
Agricultural	AF	mg/cm^2	0.3	EPA, 2002
Recreational Child	AF	mg/cm^2	0.2	EPA, 2004
Recreational Adult	AF	mg/cm^2	0.07	EPA, 2004
Visitor/Trespasser	AF	mg/cm^2	0.07	EPA, 2004
Ingestion Rate of Surface Water:				
Resident Child	IR_{sw}	L/hour	0.05	VA DEQ
Resident Adult	IR_{sw}	L/hour	0.05	VA DEQ
Commercial/Industrial Worker	IR_{sw}	L/hour	0.005	REI
Construction Worker	IR_{sw}	L/hour	0.005	REI
Agricultural	IR_{sw}	L/hour	0.005	REI
Recreational Child	IR_{sw}	L/hour	0.05	VA DEQ
Recreational Adult	IR_{sw}	L/hour	0.05	VA DEQ
Visitor/Trespasser	IR_{sw}	L/hour	0.05	VA DEQ
Exposure Time for Dermal Contact with Soil:				
All Receptors	ET_{soil}	hr/day	1	EPA, 1997 Table 1-2
Exposure Time for Surface Water:				
Resident Child (Swimming)	ET_{sw}	hr/day	3	EPA, 1997 Table 1-2
Resident Adult (Swimming)	ET_{sw}	hr/day	3	EPA, 1997 Table 1-2
Commercial/Industrial Worker (Incidental contact)	ET_{sw}	hr/day	1	MRBCA
Construction Worker (Incidental contact)	ET_{sw}	hr/day	1	MRBCA
Agricultural (Incidental contact)	ET_{sw}	hr/day	1	MRBCA
Recreational Child (Swimming)	ET_{sw}	hr/day	3	EPA, 1997 Table 1-2
Recreational Adult (Swimming)	ET_{sw}	hr/day	3	EPA, 1997 Table 1-2
Visitor/Trespasser (Swimming)	ET_{sw}	hr/day	3	EPA, 1997 Table 1-2
Exposure Frequency for Surface Water:				
Resident Child (Swimming)	EF_{sw}	days/year	12	EPA, 1997 Table 1-2
Resident Adult (Swimming)	EF_{sw}	days/year	12	EPA, 1997 Table 1-2
Commercial/Industrial Worker (Incidental contact)	EF_{sw}	days/year	250	EPA, 2002
Construction Worker (Incidental contact)	EF_{sw}	days/year	225	EPA, 2002
Agricultural (Incidental contact)	EF_{sw}	days/year	225	EPA, 2002
Recreational Child (Swimming)	EF_{sw}	days/year	12	EPA, 1997 Table 1-2
Recreational Adult (Swimming)	EF_{sw}	days/year	12	EPA, 1997 Table 1-2
Visitor/Trespasser (Swimming)	EF_{sw}	days/year	12	EPA, 1997 Table 1-2

MRBCA=	Missouri Risk-Based Corrective Action, March 2, 2005
VA DEQ=	Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991=	Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997=	Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2002=	Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24
EPA, 2004=	Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
REI=	Riverfront Environmental Incorporated Professional Judgment

TABLE 5.1
INTAKE FACTOR SUMMARY FOR GROUNDWATER PATHWAYS
Westinghouse Electric Co. Hematite Site

		Unit	Residential Child	Residential Adult	Commercial/ Industrial Worker	Construction Worker	Recreational Adult	Recreactional Child	Visitor/ Trespasser	Agricultural
Dermal: Tap or Incidental										
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	1.97E+00	3.76E+00	2.80E+00	4.15E-01	--	--	--	--
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	2.30E+01	1.10E+01	7.83E+00	2.91E+01	--	--	--	--
Dermal: Bath/Shower										
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	3.62E+01	8.45E+01	--	--	--	--	--	--
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	4.22E+02	2.47E+02	--	--	--	--	--	--
Ingestion: Oral										
IF-C	Intake Factor (Cancer)	liters/kg-day	5.48E-03	9.39E-03	3.49E-03	--	--	--	--	--
IF-N	Intake Factor (Non-cancer)	liters/kg-day	6.39E-02	2.74E-02	9.78E-03	--	--	--	--	--
Inhalation: Indoor Air										
IF-C	Intake Factor (Cancer)	m^3/kg-day	3.26E-02	6.42E-02	2.33E-02	--	--	--	--	--
IF-N	Intake Factor (Non-cancer)	m^3/kg-day	3.80E-01	1.87E-01	6.52E-02	--	--	--	--	--
Inhalation: Outdoor Air										
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.11E-02	7.82E-03	4.37E-03	1.89E-03	3.02E-03	9.19E-04	5.37E-04	5.66E-02
IF-N	Intake Factor (Non-cancer)	m^3/kg-day	1.29E-01	2.28E-02	1.22E-02	1.32E-01	8.81E-03	1.07E-02	1.56E-03	1.32E-01
Inhalation: Bath/Shower										
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.49E-03	1.51E-03	--	--	--	--	--	--
IF-N	Intake Factor (Non-cancer)	m^3/kg-day	1.74E-02	4.39E-03	--	--	--	--	--	--

TABLE 5.2
INTAKE FACTOR SUMMARY FOR SURFACE WATER/SEDIMENT PATHWAYS
Westinghouse Electric Co. Hematite Site

		Unit	Residential Child	Residential Adult	Commercial/ Industrial Worker	Construction Worker	Recreational Adult	Recreactional Child	Visitor/ Trespasser	Agricultural
Dermal										
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	1.24E+00	2.90E+00	2.80E+00	4.15E-01	2.90E+00	1.24E+00	2.90E+00	1.25E+01
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	1.45E+01	8.45E+00	7.83E+00	2.91E+01	8.45E+00	1.45E+01	8.45E+00	2.91E+01
Ingestion: Oral										
IF-C	Intake Factor (Cancer)	liters/kg-day	2.82E-05	2.42E-05	1.75E-05	6.29E-07	2.42E-05	2.82E-05	2.42E-05	1.887E-05
IF-N	Intake Factor (Non-cancer)	liters/kg-day	3.29E-04	7.05E-05	4.89E-05	4.40E-05	7.05E-05	3.29E-04	7.05E-05	4.403E-05

TABLE 5.3
INTAKE FACTOR SUMMARY FOR SURFACE AND SUBSURFACE SOIL PATHWAYS
Westinghouse Electric Co. Hematite Site

		Unit	Residential Child	Residential Adult	Commercial/ Industrial Worker	Construction Worker	Recreational Adult	Recreactional Child	Visitor/ Trespasser	Agricultural
Dermal										
IF-C	Intake Factor (Cancer)	days^-1	3.07E-06	1.87E-06	2.31E-06	1.25E-07	1.04E-06	1.71E-06	1.29E-07	3.74E-06
IF-N	Intake Factor (Non-cancer)	days^-1	3.58E-05	5.47E-06	6.46E-06	8.72E-06	3.05E-06	1.99E-05	3.75E-07	8.72E-06
Ingestion: Oral										
IF-C	Intake Factor (Cancer)	days^-1	1.10E-06	4.70E-07	3.49E-07	4.15E-08	3.27E-08	3.27E-08	4.03E-09	1.17E-06
IF-N	Intake Factor (Non-cancer)	days^-1	1.28E-05	1.37E-06	9.78E-07	2.91E-06	9.54E-08	9.54E-08	1.17E-08	2.74E-06
Inhalation: Indoor Air										
IF-C	Intake Factor (Cancer)	m^3/kg-day	3.26E-02	6.42E-02	8.52E-03	--	--	--	--	--
IF-N	Intake Factor (Non-cancer)	m^3/kg-day	3.80E-01	1.87E-01	2.39E-02	--	--	--	--	--
Inhalation: Outdoor Air										
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.11E-02	7.82E-03	4.37E-03	1.89E-03	3.02E-03	9.19E-04	5.37E-04	5.66E-02
IF-N	Intake Factor (Non-cancer)	m^3/kg-day	1.29E-01	2.28E-02	1.22E-02	1.32E-01	8.81E-03	1.07E-02	1.56E-03	1.32E-01

TABLE 6.1
TOXICOLOGICAL DATA SUMMARY
Westinghouse Electric Co. Hematite Site

Chemical Constituent of Potential Concern	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Source	Oral to Dermal Adjustment Factor (1)	Oral to Dermal Adjustment Factor Source	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Source	Oral Reference Dose (chronic) RfDo mg/kg-day	Source	Oral Reference Dose (subchronic) RfDo mg/kg-day	Source	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Source	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Source	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Source
Arsenic	1.50E+00	3.00E-04	3.00E-04	HEAST	1.00E+00	EPA 2001	1.50E+00	IRIS	3.00E-04	IRIS	3.00E-04	HEAST	1.50E+01	IRIS				
Chromium		7.50E-05	5.00E-04	HEAST	2.50E-02	EPA 2001			3.00E-03	IRIS, Cr IV	2.00E-02	HEAST	4.20E+01	IRIS, Total Cr	2.20E-06	IRIS		
Lead	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
Vanadium		2.60E-05			1.00E+00	EPA 2001			1.00E-03	NCEA								
1,1-Dichloroethene		5.00E-02			1.00E+00	EPA 2001			5.00E-02	IRIS					5.70E-02	IRIS		
cis-1,2-Dichloroethene		1.00E-02	1.00E-01	HEAST	1.00E+00	EPA 2001			1.00E-02	PPRTV	1.00E-01	HEAST			1.00E-01	route-extrapolation		
trans-1,2-Dichloroethene		2.00E-02	2.00E-01	HEAST	1.00E+00	EPA 2001			2.00E-02	IRIS	2.00E-01	HEAST			2.00E-02	route-extrapolation		
Methylene chloride	7.50E-03	6.00E-02	6.00E-02	HEAST	1.00E+00	EPA 2001	7.50E-03	IRIS	6.00E-02	IRIS	6.00E-02	HEAST	1.60E-03	IRIS	8.60E-01	HEAST	8.60E-01	HEAST
Tetrachloroethene	5.40E-01	1.00E-02			1.00E+00	EPA 2001	5.40E-01	Cal-EPA	1.00E-02	IRIS			2.10E-02	Cal-EPA	1.00E-02	Cal-EPA		
Trichloroethene	4.00E-01	3.00E-04			1.00E+00	EPA 2001	4.00E-01	NCEA	3.00E-04	NCEA			4.00E-01	NCEA	1.00E-02	NCEA		
Vinyl Chloride (birth to adulthood)	1.50E+00	3.00E-03			1.00E+00	EPA 2001	1.50E+00	IRIS	3.00E-03	IRIS			3.10E-02	IRIS	2.90E-02	IRIS		
Vinyl chloride (adulthood)	7.20E-01	3.00E-03			1.00E+00	EPA 2001	7.20E-01	IRIS	3.00E-03	IRIS			1.50E-02	IRIS	2.90E-02	IRIS		
bis-(2-Ethylhexyl)phthalate	1.40E-02	2.00E-02			1.00E+00	EPA 2001	1.40E-02	IRIS	2.00E-02	IRIS								
Benzo(a)anthracene	7.30E-01				1.00E+00	EPA 2001	7.30E-01	IRIS/NCEA										
Benzo(a)pyrene	7.30E+00				1.00E+00	EPA 2001	7.30E+00	IRIS					3.10E+00	NCEA				
Benzo(b)fluoranthene	7.30E-01				1.00E+00	EPA 2001	7.30E-01	IRIS										
Indeno(1,2,3-cd)pyrene	7.30E-01				1.00E+00	EPA 2001	7.30E-01	IRIS										
Aroclor-1254	2.00E+00	2.00E-05			1.00E+00	EPA 2001	2.00E+00	IRIS	2.00E-05	IRIS			2.00E+00	IRIS				
Aroclor-1260	2.00E+00				1.00E+00	EPA 2001	2.00E+00	IRIS					2.00E+00	IRIS				

IRIS = USEPA Integrated Risk Information System
PPRTV = USEPA Provisional Peer Reviewed Toxicity Values
NCEA = USEPA National Center for Environmental Assessment
HEAST = Health Effects Assessment Summary Tables
Cal-EPA = California Environmental Protection Agency
EPA, 2001 = Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E).
(*) Lead exposures are modeled with EPA's IEUBK model for childern

TABLE 6.2
CHEMICAL PROPERTIES
Westinghouse Electric Co. Hematite Site

CAS No.	Chemical Constituent of Potential Concern	Henry's law constant H' (unitless)	Henry's law constant at reference T (25°C) H (atm-m^3/mol)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Soil-Water Partition Coefficient K_d (cm^3/g)
7440-38-2	Arsenic	--	--	--	--	--	8.58E-02
7440-47-3	Chromium	--	--	--	--	--	1.90E+01
7439-92-1	Lead	--	--	--	--	--	9.00E+02
7440-62-2	Vanadium	--	--	--	--	--	1.00E+03
75-35-4	1,1-Dichloroethylene	1.07E+00	2.61E-02	9.00E-02	1.04E-05	5.89E+01	3.49E-01
156-59-2	cis-1,2-Dichloroethylene	1.67E-01	4.07E-03	7.36E-02	1.13E-05	3.55E+01	2.14E-01
75-09-2	Methylene chloride	8.98E-02	2.19E-03	1.01E-01	1.17E-05	1.17E+01	7.02E-02
127-18-4	Tetrachloroethylene	7.54E-01	1.84E-02	7.20E-02	8.20E-06	1.55E+02	3.54E+00
156-60-5	trans-1,2-Dichloroethylene	3.85E-01	9.39E-03	7.07E-02	1.19E-05	5.25E+01	3.25E-01
79-01-6	Trichloroethylene	4.22E-01	1.03E-02	7.90E-02	9.10E-06	1.66E+02	5.93E-01
75-01-4	Vinyl chloride	1.11E+00	2.71E-02	1.06E-01	1.23E-05	1.86E+01	8.58E-02
117-81-7	bis-(2-Ethylhexyl)phthalate	1.02E-07	4.18E-06	3.51E-02	3.66E-06	1.06E+05	6.33E+02
56-55-3	Benzo(a)anthracene	3.35E-06	1.37E-04	5.10E-02	9.00E-06	3.70E+05	2.22E+03
50-32-8	Benzo(a)pyrene	1.13E-06	4.63E-05	4.30E-02	9.00E-06	7.39E+05	4.44E+03
205-99-2	Benzo(b)fluoranthene	1.11E-04	4.55E-03	2.50E-02	6.41E-06	1.05E+06	6.29E+03
193-39-5	Indeno(1,2,3-cd)pyrene	1.60E-06	6.56E-05	2.45E-02	6.31E-06	2.97E+06	1.78E+04
11097-69-1	Aroclor-1254	2.00E-03	8.20E-02	2.37E-02	6.08E-06	2.45E+06	1.47E+04
11096-82-5	Aroclor-1260	4.60E-03	1.89E-01	2.26E-02	5.78E-06	4.84E+06	2.90E+04

Table 6.3
RADIATION DOSE CONVERSION FACTORS
Westinghouse Electric Co. Hematite Site

Radioactive Constituent of Concern	Child 5 yrs old			Adult			Source
	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi	
Plutonium 239/240	1.23E+00	9.10E-04	2.88E-04	9.28E-01	8.88E-05	7.44E-05	USEPA, 1999
Neptunium 237	5.28E-01	5.66E-04	3.43E-04	3.96E-01	5.48E-05	3.65E-05	USEPA, 1999
Uranium 238	3.00E+02	2.50E-04	1.50E-04	1.70E+02	3.20E-05	2.20E-05	USEPA, 1999
Uranium 235	3.20E+02	2.70E-04	1.70E-04	1.70E+02	3.40E-05	2.30E-05	USEPA, 1999
Uranium 234	3.30E+02	2.70E-04	1.70E-04	1.80E+02	3.50E-05	2.40E-05	USEPA, 1999
Thorium 230	1.14E+03	2.90E-04	1.86E-04	7.91E+02	6.11E-05	4.37E-05	USEPA, 1999
Thorium 232+D	1.31E+03	6.02E-03	6.11E-03	8.53E+02	4.74E-04	3.51E-04	USEPA, 1999
Radium 226	2.28E+00	2.22E-03	9.58E-04	1.03E+00	1.57E-04	1.14E-04	USEPA, 1999
Technetium 99	8.50E+00	1.30E-05	7.60E-06	2.40E+00	7.60E-07	4.60E-07	USEPA, 1999

(USEPA, 1999). U.S. Environmental Protection Agency, Cancer Risk Coefficients for Environmental Exposure to Radionuclides, Federal Guidance Report 13, EPA 402-R-99-001, 1999.

Thorium 232	1.30E+03	3.30E-04	2.20E-04	8.50E+02	5.80E-05	4.20E-05
Thorium 228	8.08E-01	1.18E-03	7.10E-04	2.66E-01	4.92E-05	3.40E-05
Radium 228	1.27E+01	4.51E-03	5.18E-03	2.58E+00	3.67E-04	2.75E-04
Thorium 232 + D	1.31E+03	6.02E-03	6.11E-03	8.53E+02	4.74E-04	3.51E-04

Table 6.3 Radiation Dose Conversion Factors

Radioactive Constituent of Concern	Child 5 yrs old			Adult			Source
	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi	
Plutonium 239/240	1.23E+00	9.10E-04	2.88E-04	9.28E-01	8.88E-05	7.44E-05	USEPA, 1999
Neptunium 237	5.28E-01	5.66E-04	3.43E-04	3.96E-01	5.48E-05	3.65E-05	USEPA, 1999
Uranium 238	3.00E+02	2.50E-04	1.50E-04	1.70E+02	3.20E-05	2.20E-05	USEPA, 1999
Uranium 235	3.20E+02	2.70E-04	1.70E-04	1.70E+02	3.40E-05	2.30E-05	USEPA, 1999
Uranium 234	3.30E+02	2.70E-04	1.70E-04	1.80E+02	3.50E-05	2.40E-05	USEPA, 1999
Thorium 232	1.30E+03	3.30E-04	2.20E-04	8.50E+02	5.80E-05	4.20E-05	USEPA, 1999
Thorium 232 + D	1.95E+03	8.70E-04	5.60E-04	1.20E+03	1.27E-04	8.90E-05	Table 6.4
Thorium 230	1.10E+03	2.90E-04	1.90E-04	7.90E+02	5.50E-05	4.00E-05	USEPA, 1999
Thorium 228	8.08E-01	1.18E-03	7.10E-04	2.66E-01	4.92E-05	3.40E-05	USEPA, 1999
Radium 228	1.27E+01	4.51E-03	5.18E-03	2.58E+00	3.67E-04	2.75E-04	USEPA, 1999
Radium 226	2.28E+00	2.22E-03	9.58E-04	1.03E+00	1.57E-04	1.14E-04	USEPA, 1999
Technetium 99	8.50E+00	1.30E-05	7.60E-06	2.40E+00	7.60E-07	4.60E-07	USEPA, 1999

(USEPA, 1999). U.S. Environmental Protection Agency, Cancer Risk Coefficients for Environmental Exposure to Radionuclides, Federal Guidance Report 13, EPA 402-R-99-001, 1999.

TABLE 6.4
DERMAL CONTACT CHEMICAL-SPECIFIC PROPERTIES
Westinghouse Electric Co. Hematite Site

Chemical Constituent of Potential Concern	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time to Reach Steady-State t* hour	Permeability Ratio B	Fraction Absorbed FA	Absorption Factor ABS
Arsenic	1.00E-03	--	--	--	--	3.00E-02
Chromium	--	--	--	--	--	1.00E-02
Lead	1.00E-04	--	--	--	--	1.00E-02
Vanadium	1.00E-03	--	--	--	--	--
1,1-Dichloroethene	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1.00E+00	--
cis-1,2-Dichloroethene	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1.00E+00	--
trans-1,2-Dichloroethene	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1.00E+00	--
Methylene chloride	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1.00E+00	--
Tetrachloroethene	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1.00E+00	--
Trichloroethene	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1.00E+00	--
Vinyl Chloride	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1.00E+00	--
Bis(2-ethylhexyl)phthalate	2.42E-02	1.62E+01	3.90E+01	1.84E-01	8.00E-01	--
Benzo(a)anthracene	--	--	--	--	--	1.30E-01
Benzo(a)pyrene	--	--	--	--	--	1.30E-01
Benzo(b)fluoranthene	--	--	--	--	--	1.30E-01
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	1.30E-01
Aroclor-1254	--	--	--	--	--	1.40E-01
Aroclor-1260	--	--	--	--	--	1.40E-01

-- Values are either not available or not needed for the risk assessment.
Source: EPA, 2001 Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.

Radioactive Constituent of Concern	Child 5 yrs old			Adult		
	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi	Dose Conversion Factor DCF mrem/uCi	Slope Factor Morbidity 1/uCi	Slope Factor Mortality 1/uCi
Plutonium 239/240	1.23E+00	9.10E-04	2.88E-04	9.28E-01	8.88E-05	7.44E-05
Neptunium 237	5.28E-01	5.66E-04	3.43E-04	3.96E-01	5.48E-05	3.65E-05
Uranium 238	3.00E+02	2.50E-04	1.50E-04	1.70E+02	3.20E-05	2.20E-05
Uranium 235	3.20E+02	2.70E-04	1.70E-04	1.70E+02	3.40E-05	2.30E-05
Uranium 234	3.30E+02	2.70E-04	1.70E-04	1.80E+02	3.50E-05	2.40E-05
Thorium 230	1.10E+03	2.90E-04	1.90E-04	7.90E+02	5.50E-05	4.00E-05
Thorium 232+D	1.31E+03	6.02E-03	6.11E-03	8.53E+02	4.74E-04	3.51E-04
Radium 226	2.28E+00	2.22E-03	9.58E-04	1.03E+00	1.57E-04	1.14E-04
Technetium 99	8.50E+00	1.30E-05	7.60E-06	2.40E+00	7.60E-07	4.60E-07

(USEPA, 1999). U.S. Environmental Protection Agency, Cancer Risk Coefficients for Environmental Exposure to Radionuclides, Federal Guidance Report 13, EPA 402-R-99-001, 1999.

Thorium 232	1.30E+03	3.30E-04	2.20E-04	8.50E+02	5.80E-05	4.20E-05
Thorium 228	8.08E-01	1.18E-03	7.10E-04	2.66E-01	4.92E-05	3.40E-05
Radium 228	1.27E+01	4.51E-03	5.18E-03	2.58E+00	3.67E-04	2.75E-04
Thorium 232 + D	1.31E+03	6.02E-03	6.11E-03	8.53E+02	4.74E-04	3.51E-04

Source
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999
USEPA, 1999

TABLE 7.1
SUMMARY OF RISKS FOR COMPLETE EXPOSURE PATHWAYS
Westinghouse Electric Co. Hematite Site

EPC Set#	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	Cancer Risk			Hazard Quotient			Cancer Risk Radioactive Materials			Ra
							Child	Adult	Composite Adult [1]	Child	Adult	Composite Adult [1]	Child	Adult	Composite Adult [1]	Child
1	Current/Future	Groundwater from overburden wells	Groundwater	Tap Water/Shower	Resident	Dermal	5.66E-03	1.16E-02	1.73E-02	1.15E+02	5.89E+01	1.74E+02				
	Current/Future		Groundwater	Tap Water	Resident	Ingestion	1.80E-02	3.08E-02	4.88E-02	7.52E+02	3.22E+02	1.07E+03	1.04E-05	2.34E-05	3.38E-05	1.73E+00
	Current/Future		Indoor Air - Vapors	Showerhead/Bath	Resident	Inhalation	9.16E-01	9.26E-01	1.84E+00	6.97E+03	1.76E+03	8.73E+03				
	Current/Future		Indoor Air - Vapors	Foundation Cracks[2]	Resident	Inhalation	--	6.15E-04	--	--	7.64E-01	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Resident	Inhalation	8.80E-06	6.22E-06	1.50E-05	6.22E-02	1.10E-02	7.32E-02				
	Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Dermal	--	4.71E-04	--	--	2.32E+00	--				
	Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Ingestion	--	1.08E-02	--	--	1.15E+02	--	--	8.69E-06	8.69E-06	--
	Current/Future		Indoor Air - Vapors	Foundation Cracks[2]	Com. & Ind. Worker	Inhalation	--	4.58E-04	--	--	5.45E-01	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Inhalation	--	3.46E-06	--	--	5.90E-03	--				
	Current/Future		Groundwater	Outdoors	Construction Worker	Dermal	--	7.00E-05	--	--	8.51E+00	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Inhalation	--	1.31E-06	--	--	4.98E-02	--				
	Future		Outdoor Air - Vapors	Outdoors	Recreational	Inhalation	6.40E-07	2.10E-06	2.74E-06	4.04E-03	3.32E-03	7.36E-03				
	Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Inhalation	--	3.74E-07	--	--	5.90E-04	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Inhalation	--	3.93E-05	--	--	4.98E-02	--				
2	Current/Future	Groundwater from bedrock wells	Groundwater	Tap Water/Shower	Resident	Dermal	2.43E-03	4.99E-03	7.42E-03	8.14E+01	4.17E+01	1.23E+02				
	Current/Future		Groundwater	Tap Water	Resident	Ingestion	9.61E-03	1.65E-02	2.61E-02	5.48E+02	2.35E+02	7.83E+02	6.16E-06	3.00E-05	3.62E-05	9.22E-01
	Current/Future		Indoor Air - Vapors	Showerhead/Bath	Resident	Inhalation	6.53E-01	6.60E-01	1.31E+00	3.55E+03	8.96E+02	4.44E+03				
	Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Dermal	--	2.02E-04	--	--	1.64E+00	--				
	Current/Future		Groundwater	Tap Water	Com. & Ind. Worker	Ingestion	--	5.80E-03	--	--	8.39E+01	--	--	1.12E-05	1.12E-05	--
3	Current/Future	Surface Water/ Sediment	Surface Water/Sediment	Stream or Pond	Resident/Recreational / Visitor/Trespasser	Dermal	3.51E-07	2.85E-07	6.35E-07	3.73E-02	2.99E-03	4.03E-02				
	Current/Future		Surface Water/Sediment	Stream or Pond	Resident/Recreational /	Ingestion	3.32E-07	8.19E-07	1.15E-06	1.42E-02	2.15E-02	3.57E-02	7.71E-07	9.94E-07	1.77E-06	2.68E-01
	Current/Future		Outdoor Air - Vapors	Stream or Pond	Resident/Recreational /	Inhalation	--	--	--	--	--	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Com. & Ind. Worker	Dermal	--	2.06E-07	--	--	2.08E-03	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Com. & Ind. Worker	Ingestion	--	4.20E-07	--	--	6.63E-03	--	--	3.70E-07	3.70E-07	--
	Current/Future		Outdoor Air - Vapors	Stream or Pond	Com. & Ind. Worker	Inhalation	--	--	--	--	--	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Construction Worker	Dermal	--	6.23E-08	--	--	2.46E-02	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Construction Worker	Ingestion	--	7.42E-09	--	--	1.87E-03	--	--	1.33E-08	1.33E-08	--
	Current/Future		Outdoor Air - Vapors	Stream or Pond	Construction Worker	Inhalation	--	--	--	--	--	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Agricultural Worker	Dermal	--	1.87E-06	--	--	2.46E-02	--				
	Current/Future		Surface Water/Sediment	Stream or Pond	Agricultural Worker	Ingestion	--	2.23E-07	--	--	1.87E-03	--	--	3.99E-07	3.99E-07	--
	Current/Future		Outdoor Air - Vapors	Stream or Pond	Agricultural Worker	Inhalation	--	--	--	--	--	--				

TABLE 7.1
SUMMARY OF RISKS FOR COMPLETE EXPOSURE PATHWAYS
Westinghouse Electric Co. Hematite Site

EPC Set#	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	Cancer Risk			Hazard Quotient			Cancer Risk Radioactive Materials			Ra
							Child	Adult	Composite Adult (1)	Child	Adult	Composite Adult (1)	Child	Adult	Composite Adult (1)	Child
4	Current/Future	Surface Soil	Surface Soil	Outdoors	Resident	Dermal	7.70E-06	4.70E-06	1.24E-05	2.70E-01	4.13E-02	3.12E-01				
	Current/Future		Surface Soil	Outdoors	Resident	Ingestion	5.32E-05	2.28E-05	7.60E-05	1.27E+00	1.36E-01	1.40E+00	4.32E-05	8.73E-06	5.19E-05	3.41E+00
	Current/Future		Surface Soil	Outdoors	Resident	External	--	--	--	--	--	--	7.77E-04	2.57E-03	3.35E-03	1.84E+02
	Current/Future		Outdoor Air - Vapors	Outdoors	Resident	Inhalation	2.91E-09	2.06E-09	4.97E-09	0.00E+00	0.00E+00	0.00E+00				
	Current/Future		Outdoor Air - Particulates	Outdoors	Resident	Inhalation	1.53E-08	1.08E-08	2.61E-08	1.53E-03	2.70E-04	1.80E-03	1.25E-06	7.74E-06	8.98E-06	2.92E+00
	Current/Future		Indoor Air - Vapors	Foundation Cracks	Resident	Inhalation	--	--	--	--	--	--				
	Current/Future		Surface Soil	Outdoors	Com. & Ind. Worker	Dermal	--	5.79E-06	--	--	4.88E-02	--				
	Current/Future		Surface Soil	Outdoors	Com. & Ind. Worker	Ingestion	--	1.70E-05	--	--	9.71E-02	--		6.50E-06	6.50E-06	
	Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Inhalation	--	1.15E-09	--	--	0.00E+00	--				
	Current/Future		Surface Soil	Outdoors	Com. & Ind. Worker	External	--	--	--	--	--	--		1.78E-04		
	Current/Future		Outdoor Air - Particulates	Outdoors	Com. & Ind. Worker	Inhalation	--	6.04E-09	--	--	1.45E-04	--		2.00E-07		
	Current/Future		Indoor Air - Vapors	Foundation Cracks	Com. & Ind. Worker	Inhalation	--	--	--	--	--	--				
	Current/Future		Surface Soil	Outdoors	Construction Worker	Dermal	--	2.73E-07	--	--	2.64E-02	--				
	Current/Future		Surface Soil	Outdoors	Construction Worker	Ingestion	--	1.78E-06	--	--	2.26E-01	--		7.72E-07	7.72E-07	
	Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Inhalation	--	4.38E-10	--	--	0.00E+00	--		2.25E-06		
	Current/Future		Outdoor Air - Particulates	Outdoors	Construction Worker	Inhalation	--	2.34E-09	--	--	1.40E-03	--				
	Future		Surface Soil	Outdoors	Recreational	Dermal	3.74E-06	2.29E-06	6.03E-06	1.35E-01	2.06E-02	1.55E-01				
	Future		Surface Soil	Outdoors	Recreational	Ingestion	1.40E-06	1.40E-06	2.80E-06	8.41E-03	8.41E-03	1.68E-02	2.41E-05	4.87E-06	2.90E-05	1.90E+00
	Future		Outdoor Air - Vapors	Outdoors	Recreational	Inhalation	2.13E-10	7.01E-10	9.14E-10	0.00E+00	0.00E+00	0.00E+00				
	Future		Outdoor Air - Particulates	Outdoors	Recreational	Inhalation	1.14E-09	3.74E-09	4.88E-09	1.14E-04	9.34E-05	2.07E-04		1.15E-08		
	Current/Future		Surface Soil	Outdoors	Visitor/Trespasser	Dermal	--	2.81E-07	--	--	2.53E-03	--				
	Current/Future		Surface Soil	Outdoors	Visitor/Trespasser	Ingestion	--	1.72E-07	--	--	1.03E-03	--		5.99E-07	5.99E-07	
	Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Inhalation	--	1.25E-10	--	--	0.00E+00	--				
	Current/Future		Outdoor Air - Particulates	Outdoors	Visitor/Trespasser	Inhalation	--	6.65E-10	--	--	1.66E-05	--				
	Current/Future		Surface Soil	Outdoors	Agricultural Worker	Dermal	--	8.18E-06	--	--	5.89E-02	--				
	Current/Future		Surface Soil	Outdoors	Agricultural Worker	Ingestion	--	5.02E-05	--	--	2.41E-01	--		1.40E-05	1.40E-05	
	Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Inhalation	--	1.31E-08	--	--	0.00E+00	--				
	Current/Future		Outdoor Air - Particulates	Outdoors	Agricultural Worker	Inhalation	--	7.02E-08	--	--	1.40E-03	--				
5	Current/Future	Subsurface Soil	Indoor Air - Vapors	Foundation Cracks(2)	Resident	Inhalation	--	4.89E-05	--	--	3.55E-02	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Resident	Inhalation	1.67E-07	7.80E-08	2.45E-07	2.02E-03	2.35E-04	2.25E-03				
	Current/Future		Indoor Air - Vapors	Foundation Cracks(2)	Com. & Ind. Worker	Inhalation	--	3.64E-05	--	--	2.54E-02	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Com. & Ind. Worker	Inhalation	--	4.35E-08	--	--	1.26E-04	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Construction Worker	Inhalation	--	2.78E-08	--	--	1.67E-03	--				
	Current/Future		Outdoor Air - Particulates	Outdoors	Construction Worker	Inhalation	--	1.44E-10	--	--	3.88E-09	--				
	Future		Outdoor Air - Vapors	Outdoors	Recreational	Inhalation	1.35E-08	4.45E-08	5.80E-08	1.36E-04	1.11E-04	2.47E-04				
	Current/Future		Outdoor Air - Vapors	Outdoors	Visitor/Trespasser	Inhalation	--	7.90E-09	--	--	1.98E-05	--				
	Current/Future		Outdoor Air - Vapors	Outdoors	Agricultural Worker	Inhalation	--	8.34E-07	--	--	1.67E-03	--				
	Current/Future		Outdoor Air - Particulates	Outdoors	Agricultural Worker	Inhalation	--	4.32E-09	--	--	3.88E-09	--				
6	Current/Future	Subsurface Soil to depth of 15 feet	Subsurface Soil	Outdoors	Construction Worker	Dermal	--	3.74E-10	--	--	6.11E-03	--				
	Current/Future		Subsurface Soil	Outdoors	Construction Worker	Ingestion	--	4.40E-07	--	--	6.79E-02	--		9.15E-07		

(1) Composite adult is the risk of an individual for 30 years: 6 years as a child and 24 years as an adult.
(2) Risk is based on a slab on grade foundation. The risk calculations show the slab on grade foundation is more conservative than the basement foundation. The basement foundation calculations are shown on the calculation sheets. The models used for this pathway only calculate risk for the adult, since RFCs and URFs are based on the adult receptor.

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ıdiation TEDE mrem/yr		Calculation Worksheets
Adult	Composite Adult [1]	
		7.1-7.4
1.20E+00	2.93E+00	7.5, 7.6, 7.84, 7.8
		3.1, 7.7-7.8
		8.1, 8.5-8.18
		3.3, 7.9-710
		7.11
4.28E-01	4.28E-01	3.1, 7.12, 7.86
		8.2, 8.19-8.32
		3.3, 7.13
		7.14
		3.3, 7.15
		3.3, 7.16-7.17
		3.3, 7.18
		3.3, 7.19
		7.20-7.23
1.01E+00	1.93E+00	7.24, 7,.25, 7.87, 7.
		3.2, 7.26-7.27
		7.28
3.60E-01	3.60E-01	3.2, 7.29, 7.89
		7.30-7.31
3.05E-01	5.73E-01	7.32, 7.33, 7.90, 7.!
		--
		7.34
1.09E-01	1.09E-01	3.3, 7.35, 7.93
		--
		7.36
9.81E-02	9.81E-02	3.3, 7.92
		--
		7.38
9.81E-02	9.81E-02	3.3, 7.39, 7.94
		--

TABLE 8.1 SUMMARY OF RISKS FOR COMPLETE EXPOSURE PATHWAYS BY RECEPTOR
Westinghouse Electric Co. Hematite Site

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Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Resident	Current/Future	Groundwater from overburden wells	Groundwater	Tap Water/Shower	Dermal	5.66E-03	1.16E-02	1.73E-02	1.15E+02	5.89E+01	1.74E+02
		Groundwater from overburden wells	Groundwater	Tap Water	Ingestion	1.80E-02	3.08E-02	4.88E-02	7.52E+02	3.22E+02	1.07E+03
		Groundwater from overburden wells	Indoor Air - Vapors	Showerhead/Bath	Inhalation	9.16E-01	9.26E-01	1.84E+00	6.97E+03	1.76E+03	8.73E+03
		Groundwater from bedrock wells	Groundwater	Tap Water/Shower	Dermal	2.43E-03	4.99E-03	7.42E-03	8.14E+01	4.17E+01	1.23E+02
		Groundwater from bedrock wells	Groundwater	Tap Water	Ingestion	9.61E-03	1.65E-02	2.61E-02	5.48E+02	2.35E+02	7.83E+02
		Groundwater from bedrock wells	Indoor Air - Vapors	Showerhead/Bath	Inhalation	6.53E-01	6.60E-01	1.31E+00	3.55E+03	8.96E+02	4.44E+03
		Groundwater	Indoor Air - Vapors	Foundation Cracks	Inhalation	1.50E-03	2.96E-03	4.46E-03	1.06E+01	5.23E+00	1.59E+01
		Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	8.80E-06	6.22E-06	1.50E-05	6.22E-02	1.10E-02	7.32E-02
		Surface Water/ Sediment	Surface Water/Sediment	Stream or Pond	Dermal	3.51E-07	2.85E-07	6.35E-07	3.73E-02	2.99E-03	4.03E-02
		Surface Water/ Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	3.32E-07	8.19E-07	1.15E-06	1.42E-02	2.15E-02	3.57E-02
		Surface Water/ Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Surface Soil	Surface Soil	Outdoors	Dermal	7.70E-06	4.70E-06	1.24E-05	2.70E-01	4.13E-02	3.12E-01
		Surface Soil	Surface Soil	Outdoors	Ingestion	5.32E-05	2.28E-05	7.60E-05	1.27E+00	1.36E-01	1.40E+00
		Surface Soil	Surface Soil	Outdoors	External	--	--	--	--	--	--
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	2.91E-09	2.06E-09	4.97E-09	0.00E+00	0.00E+00	0.00E+00
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	1.53E-08	1.08E-08	2.61E-08	1.53E-03	2.70E-04	1.80E-03
		Surface Soil	Indoor Air - Vapors	Foundation Cracks	Inhalation	1.94E-07	1.37E-07	3.31E-07	0.00E+00	0.00E+00	0.00E+00
		Subsurface Soil	Indoor Air - Vapors	Foundation Cracks	Inhalation	3.19E-05	6.29E-05	9.49E-05	2.29E-01	1.13E-01	3.42E-01
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	1.67E-07	7.80E-08	2.45E-07	2.02E-03	2.35E-04	2.25E-03
					Total	**1.61E+00**	**1.65E+00**	**3.26E+00**	**1.20E+04**	**3.32E+03**	**1.53E+04**

Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Commercial/Industrial Worker	Current/Future	Groundwater from overburden wells	Groundwater	Tap Water	Dermal	--	4.71E-04	--	--	2.32E+00	--
		Groundwater from overburden wells	Groundwater	Tap Water	Ingestion	--	1.08E-02	--	--	1.15E+02	--
		Groundwater from bedrock wells	Groundwater	Tap Water	Dermal	--	2.02E-04	--	--	1.64E+00	--
		Groundwater from bedrock wells	Groundwater	Tap Water	Ingestion	--	5.80E-03	--	--	8.39E+01	--
		Groundwater	Indoor Air - Vapors	Foundation Cracks	Inhalation	--	1.07E-03	--	--	1.82E+00	--
		Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	--	3.46E-06	--	--	5.90E-03	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Dermal	--	2.06E-07	--	--	2.08E-03	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	--	4.20E-07	--	--	6.63E-03	--
		Surface Water/Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Surface Soil	Surface Soil	Outdoors	Dermal	--	5.79E-06	--	--	4.88E-02	--
		Surface Soil	Surface Soil	Outdoors	Ingestion	--	1.70E-05	--	--	9.71E-02	--
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	1.15E-09	--	--	0.00E+00	--
		Surface Soil	Surface Soil	Outdoors	External	--	--	--	--	--	--
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	6.04E-09	--	--	1.45E-04	--
		Surface Soil	Indoor Air - Vapors	Foundation Cracks	Inhalation	--	7.65E-08	--	--	0.00E+00	--
		Subsurface Soil	Indoor Air - Vapors	Foundation Cracks	Inhalation	--	8.35E-06	--	--	1.44E-02	--
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	4.35E-08	--	--	1.26E-04	--
					Total		**1.84E-02**			**2.05E+02**	

Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Construction Worker	Current/Future	Groundwater	Groundwater	Outdoors	Dermal	--	7.00E-05	--	--	8.51E+00	--
		Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	--	1.31E-06	--	--	4.98E-02	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Dermal	--	6.23E-08	--	--	2.46E-02	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	--	7.42E-09	--	--	1.87E-03	--
		Surface Water/Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Subsurface Soil	Subsurface Soil	Outdoors	Dermal	--	3.74E-10	--	--	6.11E-03	--
		Subsurface Soil	Subsurface Soil	Outdoors	Ingestion	--	4.40E-07	--	--	6.79E-02	--
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	2.78E-08	--	--	1.67E-03	--
		Subsurface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	1.44E-10	--	--	3.88E-09	--
		Surface Soil	Surface Soil	Outdoors	Dermal	--	2.73E-07	--	--	2.64E-02	--
		Surface Soil	Surface Soil	Outdoors	Ingestion	--	1.78E-06	--	--	2.26E-01	--
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	4.38E-10	--	--	0.00E+00	--
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	2.34E-09	--	--	1.40E-03	--
					Total		**7.39E-05**			**8.91E+00**	

(1) Composite adult is the risk of an individual for 30 years: 6 years as a child and 24 years as an adult.

Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Recreational	Future	Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	6.40E-07	2.10E-06	2.74E-06	4.04E-03	3.32E-03	7.36E-03
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Dermal	3.51E-07	2.85E-07	6.35E-07	3.73E-02	2.99E-03	4.03E-02
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	3.32E-07	8.19E-07	1.15E-06	1.42E-02	2.15E-02	3.57E-02
		Surface Water/Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	1.35E-08	4.45E-08	5.80E-08	1.36E-04	1.11E-04	2.47E-04
		Surface Soil	Surface Soil	Outdoors	Dermal	3.74E-06	2.29E-06	6.03E-06	1.35E-01	2.06E-02	1.55E-01
		Surface Soil	Surface Soil	Outdoors	Ingestion	1.40E-06	1.40E-06	2.80E-06	8.41E-03	8.41E-03	1.68E-02
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	2.13E-10	7.01E-10	9.14E-10	0.00E+00	0.00E+00	0.00E+00
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	1.14E-09	3.74E-09	4.88E-09	1.14E-04	9.34E-05	2.07E-04
					Total	**6.48E-06**	**6.94E-06**	**1.34E-05**	**1.99E-01**	**5.70E-02**	**2.56E-01**

Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Visitor/Trespasser	Current/Future	Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	--	3.74E-07	--	--	5.90E-04	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Dermal	--	2.85E-07	--	--	2.99E-03	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	--	8.19E-07	--	--	2.15E-02	--
		Surface Water/Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	7.90E-09	--	--	1.98E-05	--
		Surface Soil	Surface Soil	Outdoors	Dermal	--	2.81E-07	--	--	2.53E-03	--
		Surface Soil	Surface Soil	Outdoors	Ingestion	--	1.72E-07	--	--	1.03E-03	--
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	1.25E-10	--	--	0.00E+00	--
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	6.65E-10	--	--	1.66E-05	--
					Total		**1.94E-06**			**2.87E-02**	

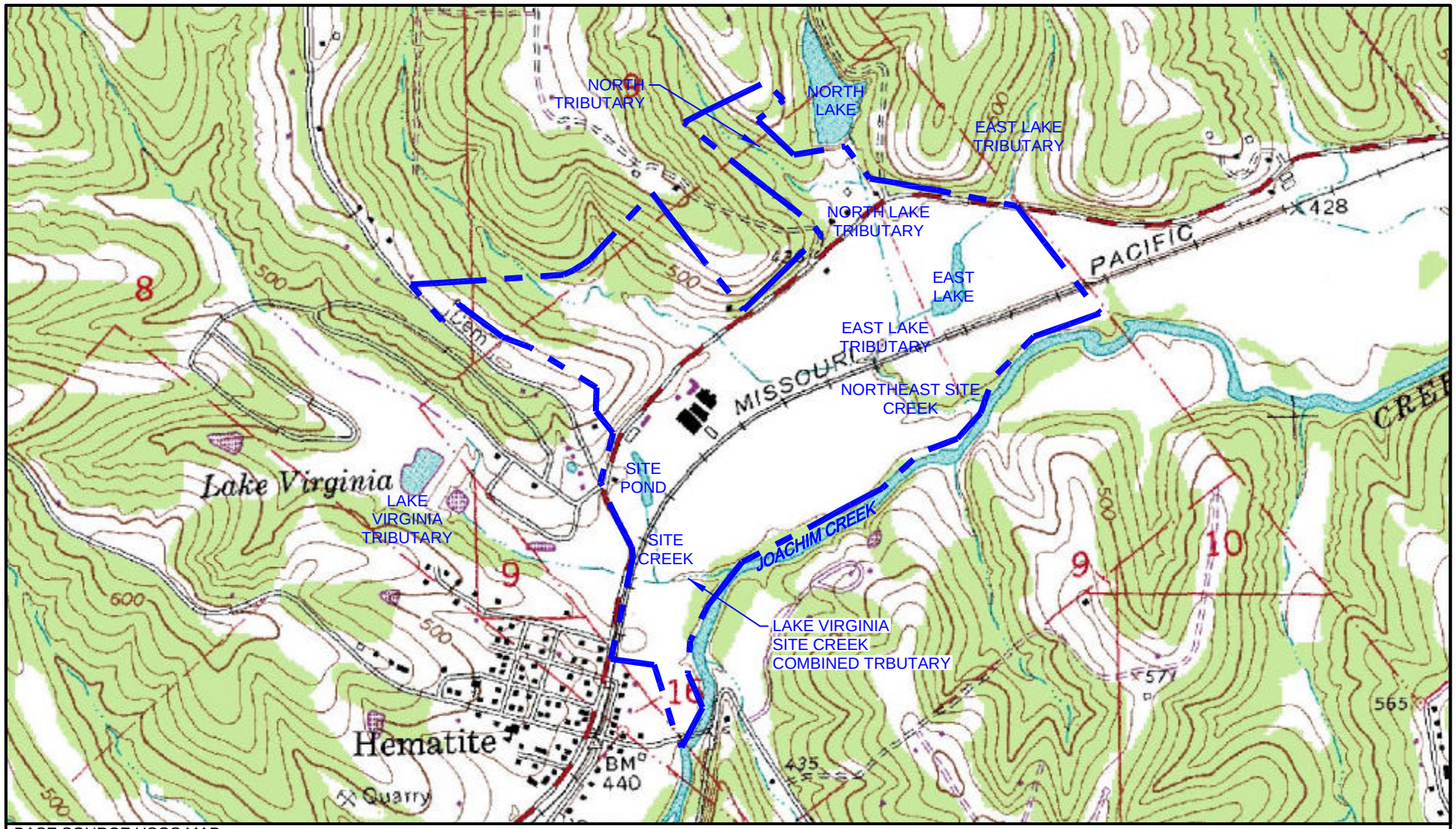
Receptor Population	Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Exposure Route	Cancer Risk			Hazard Quotient		
						Child	Adult	Composite Adult	Child	Adult	Composite Adult
Agricultural Worker	Current/Future	Groundwater	Outdoor Air - Vapors	Outdoors	Inhalation	--	3.93E-05	--	--	4.98E-02	--
		Surface Water/Sediment	Surface Water/Sediment	Stream or Pond	Dermal	--	1.87E-06	--	--	2.46E-02	--
		Surface Water/ Sediment	Surface Water/Sediment	Stream or Pond	Ingestion	--	2.23E-07	--	--	1.87E-03	--
		Surface Water/ Sediment	Outdoor Air - Vapors	Stream or Pond	Inhalation	--	--	--	--	--	--
		Subsurface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	8.34E-07	--	--	1.67E-03	--
		Subsurface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	4.32E-09	--	--	3.88E-09	--
		Surface Soil	Surface Soil	Outdoors	Dermal	--	8.18E-06	--	--	5.89E-02	--
		Surface Soil	Surface Soil	Outdoors	Ingestion	--	5.02E-05	--	--	2.41E-01	--
		Surface Soil	Outdoor Air - Vapors	Outdoors	Inhalation	--	1.31E-08	--	--	0.00E+00	--
		Surface Soil	Outdoor Air - Particulates	Outdoors	Inhalation	--	7.02E-08	--	--	1.40E-03	--
					Total		**1.01E-04**			**3.80E-01**	

(1) Composite adult is the risk of an individual for 30 years: 6 years as a child and 24 years as an adult.

DRAFT

ıdiation TEDE mrem/yr		Calculation Worksheets
Adult	Composite Adult [1]	
		7.40-7.41
8.96E-01	4.31E+00	7.42, 7.43, 7-95, 7.
1.74E+02	3.58E+02	RAD 321004, 3210
		3.4, 7.44-7.45
5.61E+00	8.53E+00	3.4, 7.46-7.47
		--
		7.48
6.40E-01	6.40E-01	3.4, 7.97
		3.4, 7.5
9.99E+00		--
1.24E-01		3.5, 7.51
		--
		7.52
1.90E+00	1.90E+00	7.53, 7.98
1.63E+00		3.4, 7.54
		3.4, 7.55
		7.56-7.57
4.99E-01	2.40E+00	8-7.59, 7.99, 7.100
		3.4, 7.60-7.61
8.35E-03		3.5, 7.62-7.63
		7.64
6.14E-02	6.14E-02	7.65, 7.101
		3.4, 7.66
		3.4, 7.67
		7.68
1.15E+00	1.15E+00	7.69, 7.102
		3.4, 7.7
		3.4, 7.71
		8.3, 8.33-8.36
		3.6, 7.72-7.73
		8.4, 8.37-8.40
		3.6, 7.74
		3.6, 7.75
		3.5, 7.76
		3.6, 7.77-7.78
		3.6, 7.79
		3.6, 7.8
		3.5, 7.81
		7.82
6.72E+00		3.6, 7.83, 7.103

9.0 Figures



BASE SOURCE USGS MAP
FESTUS, MISSOURI 1964, REVISED 1982

LEGEND

PROPERTY BOUNDARY

0 600 1200ft

figure 1

HEMATITE SITE MAP
WESTINGHOUSE FACILITY
Hematite, Missouri

38008-00(SOURCE)GN-CO001 OCT 17/2005

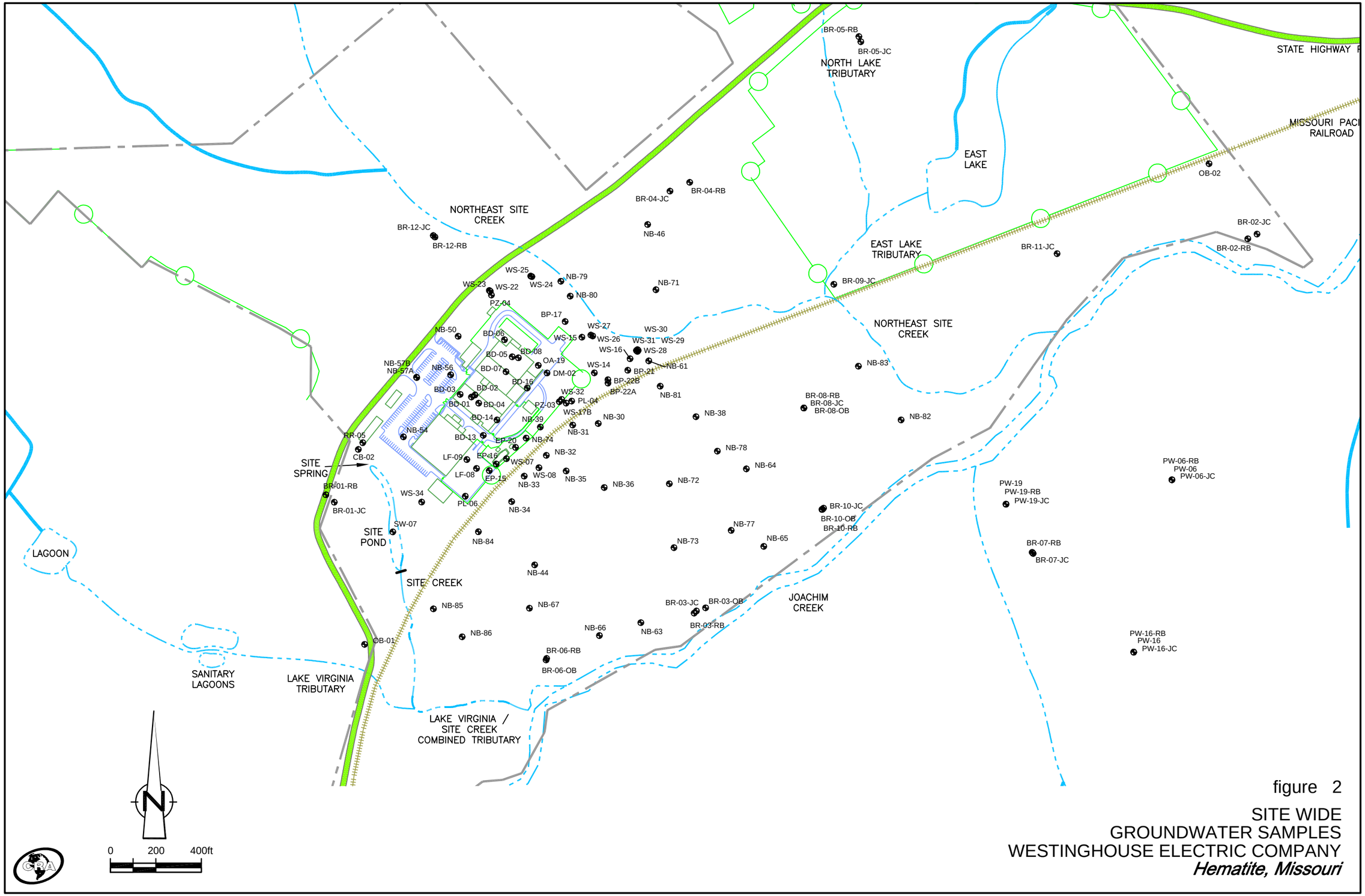


figure 2

SITE WIDE
GROUNDWATER SAMPLES
WESTINGHOUSE ELECTRIC COMPANY
Hematite, Missouri

38008-00(SOURCE)GN-CO005 OCT 17/2005

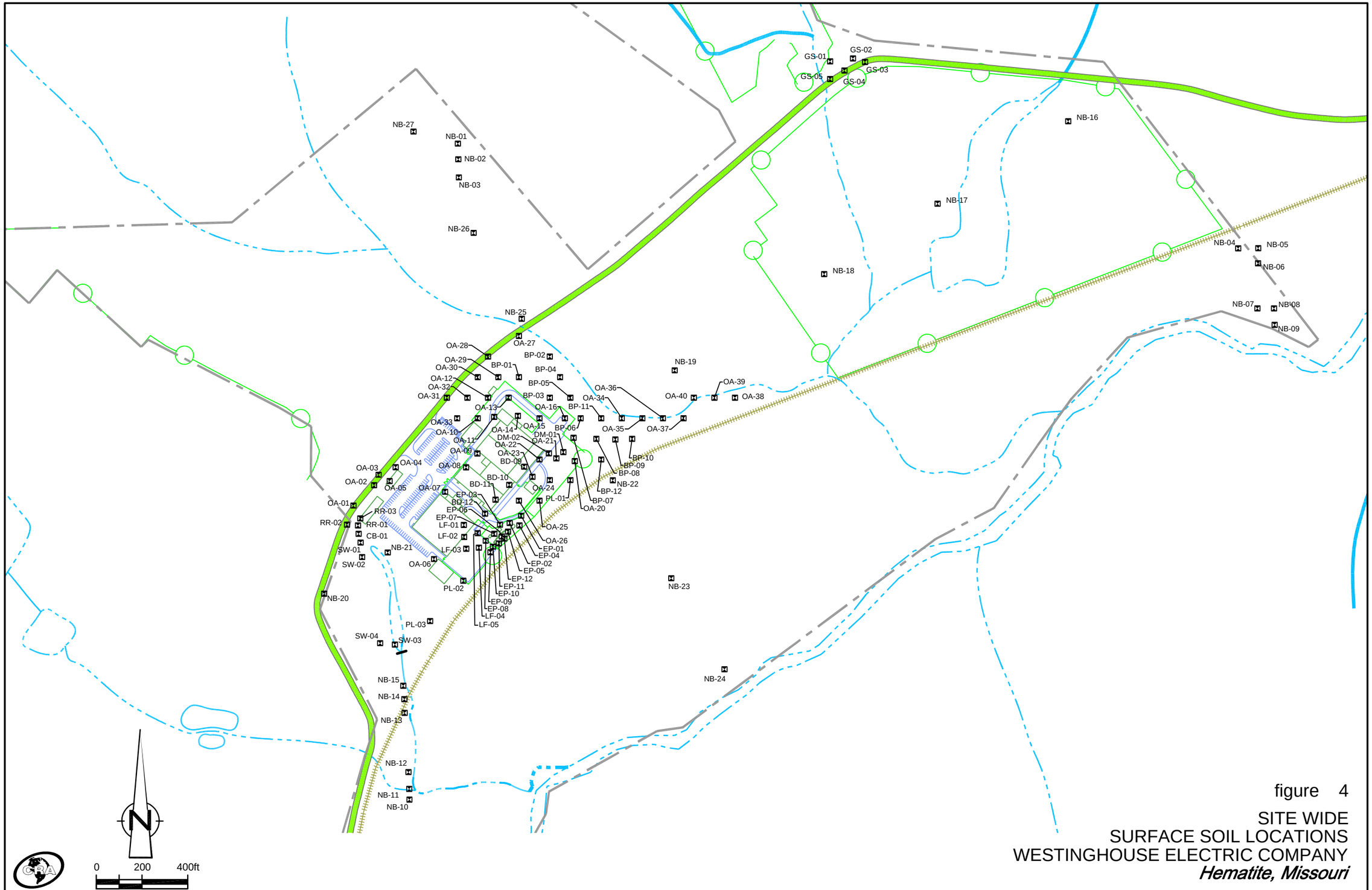


figure 4

SITE WIDE
SURFACE SOIL LOCATIONS
WESTINGHOUSE ELECTRIC COMPANY
Hematite, Missouri

38008-00(SOURCE)GN-CO003 OCT 17/2005

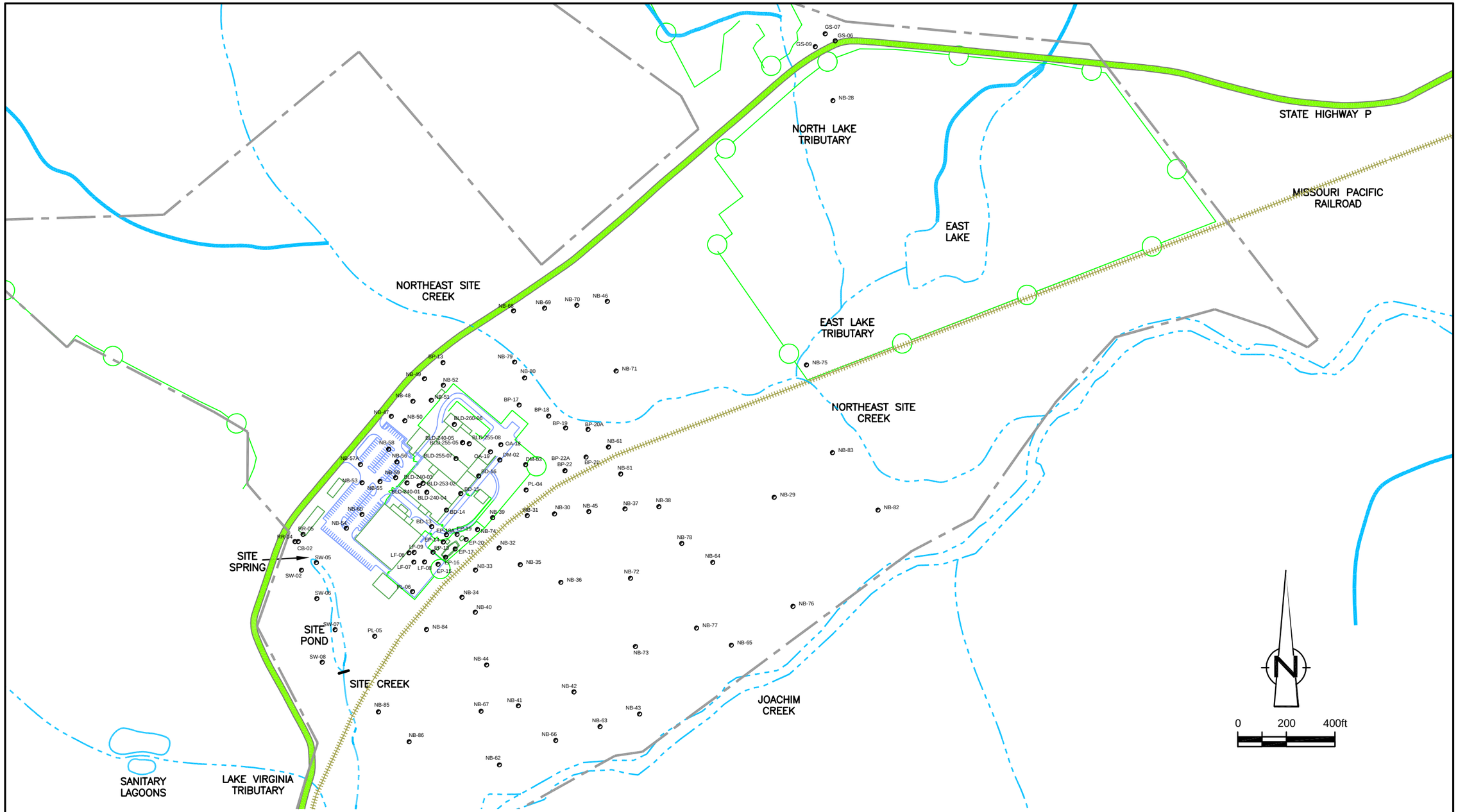


figure 5

SITE WIDE
SUBSURFACE SOIL LOCATIONS
WESTINGHOUSE ELECTRIC COMPANY
Hematite, Missouri

38008-00(SOURCE)GN-CO002 OCT 17/2005

10.0 Appendix

Appendix A – Summary of Analytical Results by EPC

PRO-UCL OUTPUT

EPC Set: 1 **COPC: 1,1-Dichloroethene**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	46
Minimum	1.1
Maximum	790
Mean	67.00543
Median	3.85
Standard Deviation	149.5124
Variance	22353.96
Coefficient of Variation	2.231347
Skewness	3.052848

Gamma Statistics	
k hat	0.367861
k star (bias corrected)	0.363112
Theta hat	182.1486
Theta star	184.5309
nu hat	67.6865
nu star	66.81266
Approx.Chi Square Value (.05)	48.99833
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	48.75622

Log-transformed Statistics	
Minimum of log data	0.09531
Maximum of log data	6.672033
Mean of log data	2.391548
Standard Deviation of log data	1.842862
Variance of log data	3.396139

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.338756
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	92.90869

Gamma Distribution Test	
A-D Test Statistic	9.420517
A-D 5% Critical Value	0.851095
K-S Test Statistic	0.257859
K-S 5% Critical Value	0.100345
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	91.36662
Adjusted Gamma UCL	91.82032

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.277427
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	109.3705
95% Chebyshev (MVUE) UCL	128.9167
97.5% Chebyshev (MVUE) UCL	160.0568
99% Chebyshev (MVUE) UCL	221.2256

95% Non-parametric UCLs	
CLT UCL	92.64499
Adj-CLT UCL (Adjusted for skewness)	97.9462
Mod-t UCL (Adjusted for skewness)	93.73557
Jackknife UCL	92.90869
Standard Bootstrap UCL	92.14414
Bootstrap-t UCL	102.9684
Hall's Bootstrap UCL	97.68782
Percentile Bootstrap UCL	93.17935
BCA Bootstrap UCL	98.2913
95% Chebyshev (Mean, Sd) UCL	134.9508
97.5% Chebyshev (Mean, Sd) UCL	164.3509
99% Chebyshev (Mean, Sd) UCL	222.1015

PRO-UCL OUTPUT

EPC Set: 1 **COPC: cis-1,2-Dichloroethene**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	51
Minimum	1
Maximum	19000
Mean	434.5413
Median	8.3
Standard Deviation	2062.091
Variance	4252221
Coefficient of Variation	4.745444
Skewness	8.33065

Gamma Statistics	
k hat	0.236958
k star (bias corrected)	0.236477
Theta hat	1833.833
Theta star	1837.559
nu hat	43.60027
nu star	43.51186
Approx.Chi Square Value (.05)	29.3831
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	29.19849

Log-transformed Statistics	
Minimum of log data	0
Maximum of log data	9.852194
Mean of log data	3.050823
Standard Deviation of log data	2.44255
Variance of log data	5.966051

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.416739
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	791.8019

Gamma Distribution Test	
A-D Test Statistic	8.998191
A-D 5% Critical Value	0.895376
K-S Test Statistic	0.21803
K-S 5% Critical Value	0.102533
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	643.489
Adjusted Gamma UCL	647.5575

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.254564
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	1127.743
95% Chebyshev (MVUE) UCL	1071.19
97.5% Chebyshev (MVUE) UCL	1374.391
99% Chebyshev (MVUE) UCL	1969.971

95% Non-parametric UCLs	
CLT UCL	788.1649
Adj-CLT UCL (Adjusted for skewness)	987.6817
Mod-t UCL (Adjusted for skewness)	822.9225
Jackknife UCL	791.8019
Standard Bootstrap UCL	783.4043
Bootstrap-t UCL	1793.354
Hall's Bootstrap UCL	1839.619
Percentile Bootstrap UCL	825.8315
BCA Bootstrap UCL	1071.87
95% Chebyshev (Mean, Sd) UCL	1371.652
97.5% Chebyshev (Mean, Sd) UCL	1777.14
99% Chebyshev (Mean, Sd) UCL	2573.644

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Methylene chloride**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	22
Minimum	2.5
Maximum	1600
Mean	52.72065
Median	2.5
Standard Deviation	215.2767
Variance	46344.08
Coefficient of Variation	4.083348
Skewness	6.049708

Gamma Statistics	
k hat	0.329725
k star (bias corrected)	0.326219
Theta hat	159.8929
Theta star	161.6111
nu hat	60.66935
nu star	60.02434
Approx.Chi Square Value (.05)	43.20552
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	42.97896

Log-transformed Statistics	
Minimum of log data	0.916291
Maximum of log data	7.377759
Mean of log data	1.905677
Standard Deviation of log data	1.555072
Variance of log data	2.418248

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.40777
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	90.01769

Gamma Distribution Test	
A-D Test Statistic	16.64587
A-D 5% Critical Value	0.860521
K-S Test Statistic	0.325902
K-S 5% Critical Value	0.100843
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	73.24347
Adjusted Gamma UCL	73.62957

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.332969
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	35.53313
95% Chebyshev (MVUE) UCL	43.60571
97.5% Chebyshev (MVUE) UCL	52.99509
99% Chebyshev (MVUE) UCL	71.43871

95% Non-parametric UCLs	
CLT UCL	89.638
Adj-CLT UCL (Adjusted for skewness)	104.764
Mod-t UCL (Adjusted for skewness)	92.37704
Jackknife UCL	90.01769
Standard Bootstrap UCL	89.41459
Bootstrap-t UCL	164.7649
Hall's Bootstrap UCL	262.7872
Percentile Bootstrap UCL	93.47935
BCA Bootstrap UCL	106.8446
95% Chebyshev (Mean, Sd) UCL	150.5524
97.5% Chebyshev (Mean, Sd) UCL	192.8843
99% Chebyshev (Mean, Sd) UCL	276.0371

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Tetrachloroethene**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	56
Minimum	1.4
Maximum	14000
Mean	708.313
Median	22
Standard Deviation	2140.908
Variance	4583489
Coefficient of Variation	3.022545
Skewness	5.420146

Gamma Statistics	
k hat	0.241124
k star (bias corrected)	0.240508
Theta hat	2937.546
Theta star	2945.074
nu hat	44.36683
nu star	44.25342
Approx.Chi Square Value (.05)	29.99378
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	29.80713

Log-transformed Statistics	
Minimum of log data	0.336472
Maximum of log data	9.546813
Mean of log data	3.599954
Standard Deviation of log data	2.68664
Variance of log data	7.218034

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.370627
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1079.229

Gamma Distribution Test	
A-D Test Statistic	6.727832
A-D 5% Critical Value	0.893558
K-S Test Statistic	0.189323
K-S 5% Critical Value	0.102447
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1045.059
Adjusted Gamma UCL	1051.603

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.178033
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	4410.934
95% Chebyshev (MVUE) UCL	3619.714
97.5% Chebyshev (MVUE) UCL	4689.707
99% Chebyshev (MVUE) UCL	6791.502

95% Non-parametric UCLs	
CLT UCL	1075.453
Adj-CLT UCL (Adjusted for skewness)	1210.225
Mod-t UCL (Adjusted for skewness)	1100.251
Jackknife UCL	1079.229
Standard Bootstrap UCL	1071.266
Bootstrap-t UCL	1657.983
Hall's Bootstrap UCL	2937.273
Percentile Bootstrap UCL	1109.849
BCA Bootstrap UCL	1257.572
95% Chebyshev (Mean, Sd) UCL	1681.242
97.5% Chebyshev (Mean, Sd) UCL	2102.229
99% Chebyshev (Mean, Sd) UCL	2929.176

PRO-UCL OUTPUT

EPC Set: 1 **COPC: trans-1,2-Dichloroethene**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	27
Minimum	2.5
Maximum	700
Mean	43.34674
Median	2.5
Standard Deviation	124.2781
Variance	15445.06
Coefficient of Variation	2.86707
Skewness	4.231317

Gamma Statistics	
k hat	0.385502
k star (bias corrected)	0.380178
Theta hat	112.4423
Theta star	114.017
nu hat	70.93239
nu star	69.95271
Approx.Chi Square Value (.05)	51.69515
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	51.44612

Log-transformed Statistics	
Minimum of log data	0.916291
Maximum of log data	6.55108
Mean of log data	2.052066
Standard Deviation of log data	1.586784
Variance of log data	2.517883

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.371202
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	64.87813

Gamma Distribution Test	
A-D Test Statistic	13.00242
A-D 5% Critical Value	0.846735
K-S Test Statistic	0.307226
K-S 5% Critical Value	0.100114
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	58.65582
Adjusted Gamma UCL	58.93976

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.328151
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	43.90231
95% Chebyshev (MVUE) UCL	53.73228
97.5% Chebyshev (MVUE) UCL	65.46905
99% Chebyshev (MVUE) UCL	88.52368

95% Non-parametric UCLs	
CLT UCL	64.65893
Adj-CLT UCL (Adjusted for skewness)	70.76642
Mod-t UCL (Adjusted for skewness)	65.83077
Jackknife UCL	64.87813
Standard Bootstrap UCL	64.71676
Bootstrap-t UCL	80.42382
Hall's Bootstrap UCL	64.34148
Percentile Bootstrap UCL	66.38587
BCA Bootstrap UCL	72.24783
95% Chebyshev (Mean, Sd) UCL	99.82453
97.5% Chebyshev (Mean, Sd) UCL	124.2625
99% Chebyshev (Mean, Sd) UCL	172.2662

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Trichloroethene**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	49
Minimum	1.2
Maximum	18000
Mean	739.0576
Median	15
Standard Deviation	2490.438
Variance	6202282
Coefficient of Variation	3.369748
Skewness	5.886332

Gamma Statistics	
k hat	0.23449
k star (bias corrected)	0.23409
Theta hat	3151.77
Theta star	3157.156
nu hat	43.1461
nu star	43.0725
Approx.Chi Square Value (.05)	29.02182
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	28.83842

Log-transformed Statistics	
Minimum of log data	0.182322
Maximum of log data	9.798127
Mean of log data	3.544954
Standard Deviation of log data	2.766082
Variance of log data	7.651207

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.38351
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1170.53

Gamma Distribution Test	
A-D Test Statistic	6.7472
A-D 5% Critical Value	0.896453
K-S Test Statistic	0.216449
K-S 5% Critical Value	0.102584
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1096.866
Adjusted Gamma UCL	1103.842

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.231199
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	5533.889
95% Chebyshev (MVUE) UCL	4296.187
97.5% Chebyshev (MVUE) UCL	5581.741
99% Chebyshev (MVUE) UCL	8106.962

95% Non-parametric UCLs	
CLT UCL	1166.137
Adj-CLT UCL (Adjusted for skewness)	1336.398
Mod-t UCL (Adjusted for skewness)	1197.087
Jackknife UCL	1170.53
Standard Bootstrap UCL	1167.175
Bootstrap-t UCL	2082.316
Hall's Bootstrap UCL	3172.539
Percentile Bootstrap UCL	1195.474
BCA Bootstrap UCL	1401.209
95% Chebyshev (Mean, Sd) UCL	1870.829
97.5% Chebyshev (Mean, Sd) UCL	2360.547
99% Chebyshev (Mean, Sd) UCL	3322.504

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Vinyl chloride**

Raw Statistics	
Number of Valid Samples	92
Number of Unique Samples	23
Minimum	1.5
Maximum	1250
Mean	77.875
Median	5
Standard Deviation	232.4532
Variance	54034.51
Coefficient of Variation	2.984953
Skewness	4.276992

Gamma Statistics	
k hat	0.374126
k star (bias corrected)	0.369173
Theta hat	208.1517
Theta star	210.9446
nu hat	68.83922
nu star	67.92779
Approx.Chi Square Value (.05)	49.95488
Adjusted Level of Significance	0.047391
Adjusted Chi Square Value	49.71029

Log-transformed Statistics	
Minimum of log data	0.405465
Maximum of log data	7.130899
Mean of log data	2.577121
Standard Deviation of log data	1.5834
Variance of log data	2.507156

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.371244
Lilliefors 5% Critical Value	0.092372
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	118.1479

Gamma Distribution Test	
A-D Test Statistic	13.59201
A-D 5% Critical Value	0.849547
K-S Test Statistic	0.331738
K-S 5% Critical Value	0.100263
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	105.8931
Adjusted Gamma UCL	106.4141

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.338143
Lilliefors 5% Critical Value	0.092372
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	73.7008
95% Chebyshev (MVUE) UCL	90.23035
97.5% Chebyshev (MVUE) UCL	109.9098
99% Chebyshev (MVUE) UCL	148.5661

95% Non-parametric UCLs	
CLT UCL	117.7379
Adj-CLT UCL (Adjusted for skewness)	129.2848
Mod-t UCL (Adjusted for skewness)	119.949
Jackknife UCL	118.1479
Standard Bootstrap UCL	116.6081
Bootstrap-t UCL	147.3064
Hall's Bootstrap UCL	117.0217
Percentile Bootstrap UCL	121.6011
BCA Bootstrap UCL	132.0326
95% Chebyshev (Mean, Sd) UCL	183.5126
97.5% Chebyshev (Mean, Sd) UCL	229.2221
99% Chebyshev (Mean, Sd) UCL	319.0095

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	89
Number of Unique Samples	9
Minimum	0.005
Maximum	0.13
Mean	0.007876
Median	0.005
Standard Deviation	0.014743
Variance	0.000217
Coefficient of Variation	1.871808
Skewness	7.181335

Gamma Statistics	
k hat	1.769249
k star (bias corrected)	1.717102
Theta hat	0.004452
Theta star	0.004587
nu hat	314.9264
nu star	305.6442
Approx.Chi Square Value (.05)	266.1368
Adjusted Level of Significance	0.047303
Adjusted Chi Square Value	265.5346

Log-transformed Statistics	
Minimum of log data	-5.298317
Maximum of log data	-2.040221
Mean of log data	-5.152361
Standard Deviation of log data	0.525298
Variance of log data	0.275938

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.487456
Lilliefors 5% Critical Value	0.093916
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.010474

Gamma Distribution Test	
A-D Test Statistic	28.0278
A-D 5% Critical Value	0.767897
K-S Test Statistic	0.528405
K-S 5% Critical Value	0.096237
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.009046
Adjusted Gamma UCL	0.009066

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.51955
Lilliefors 5% Critical Value	0.093916
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.007368
95% Chebyshev (MVUE) UCL	0.008336
97.5% Chebyshev (MVUE) UCL	0.009074
99% Chebyshev (MVUE) UCL	0.010524

95% Non-parametric UCLs	
CLT UCL	0.010447
Adj-CLT UCL (Adjusted for skewness)	0.011718
Mod-t UCL (Adjusted for skewness)	0.010673
Jackknife UCL	0.010474
Standard Bootstrap UCL	0.010348
Bootstrap-t UCL	0.018069
Hall's Bootstrap UCL	0.019831
Percentile Bootstrap UCL	0.010584
BCA Bootstrap UCL	0.012539
95% Chebyshev (Mean, Sd) UCL	0.014688
97.5% Chebyshev (Mean, Sd) UCL	0.017636
99% Chebyshev (Mean, Sd) UCL	0.023426

PRO-UCL OUTPUT

EPC Set: 1 **COPC: Lead**

Raw Statistics	
Number of Valid Samples	89
Number of Unique Samples	15
Minimum	0.0015
Maximum	0.059
Mean	0.004045
Median	0.0015
Standard Deviation	0.008581
Variance	7.36E-05
Coefficient of Variation	2.121314
Skewness	4.499392

Gamma Statistics	
k hat	0.906669
k star (bias corrected)	0.883598
Theta hat	0.004461
Theta star	0.004578
nu hat	161.3871
nu star	157.2804
Approx.Chi Square Value (.05)	129.2824
Adjusted Level of Significance	0.047303
Adjusted Chi Square Value	128.867

Log-transformed Statistics	
Minimum of log data	-6.50229
Maximum of log data	-2.830218
Mean of log data	-6.154486
Standard Deviation of log data	0.829836
Variance of log data	0.688628

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.4256
Lilliefors 5% Critical Value	0.093916
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.005557

Gamma Distribution Test	
A-D Test Statistic	22.64007
A-D 5% Critical Value	0.78677
K-S Test Statistic	0.478343
K-S 5% Critical Value	0.097913
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.004921
Adjusted Gamma UCL	0.004937

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.471426
Lilliefors 5% Critical Value	0.093916
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.0036
95% Chebyshev (MVUE) UCL	0.004286
97.5% Chebyshev (MVUE) UCL	0.00485
99% Chebyshev (MVUE) UCL	0.005959

95% Non-parametric UCLs	
CLT UCL	0.005541
Adj-CLT UCL (Adjusted for skewness)	0.006005
Mod-t UCL (Adjusted for skewness)	0.005629
Jackknife UCL	0.005557
Standard Bootstrap UCL	0.005548
Bootstrap-t UCL	0.006775
Hall's Bootstrap UCL	0.006016
Percentile Bootstrap UCL	0.005748
BCA Bootstrap UCL	0.006251
95% Chebyshev (Mean, Sd) UCL	0.00801
97.5% Chebyshev (Mean, Sd) UCL	0.009725
99% Chebyshev (Mean, Sd) UCL	0.013095

PRO-UCL OUTPUT

EPC Set: 1 **COPC: bis(2-ethyhexyl) phthalate**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	16
Minimum	4
Maximum	26
Mean	6.003846
Median	5
Standard Deviation	4.134521
Variance	17.09426
Coefficient of Variation	0.688645
Skewness	4.201484

Gamma Statistics	
k hat	5.266045
k star (bias corrected)	4.878059
Theta hat	1.140105
Theta star	1.230786
nu hat	410.7515
nu star	380.4886
Approx.Chi Square Value (.05)	336.27
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	334.636

Log-transformed Statistics	
Minimum of log data	1.386294
Maximum of log data	3.258097
Mean of log data	1.694458
Standard Deviation of log data	0.361938
Variance of log data	0.130999

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.370357
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	7.120037

Gamma Distribution Test	
A-D Test Statistic	8.364892
A-D 5% Critical Value	0.750981
K-S Test Statistic	0.41792
K-S 5% Critical Value	0.141692
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	6.793335
Adjusted Gamma UCL	6.826507

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.512473
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	6.465866
95% Chebyshev (MVUE) UCL	7.305044
97.5% Chebyshev (MVUE) UCL	7.955478
99% Chebyshev (MVUE) UCL	9.233129

95% Non-parametric UCLs	
CLT UCL	7.092827
Adj-CLT UCL (Adjusted for skewness)	7.568757
Mod-t UCL (Adjusted for skewness)	7.194273
Jackknife UCL	7.120037
Standard Bootstrap UCL	7.079955
Bootstrap-t UCL	11.158
Hall's Bootstrap UCL	11.38008
Percentile Bootstrap UCL	7.210256
BCA Bootstrap UCL	7.707692
95% Chebyshev (Mean, Sd) UCL	8.889669
97.5% Chebyshev (Mean, Sd) UCL	10.13837
99% Chebyshev (Mean, Sd) UCL	12.59119

PRO-UCL OUTPUT

EPC Set: 2 **COPC: 1,1-Dichloroethene**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	14
Minimum	0.98
Maximum	210
Mean	21.69179
Median	2.5
Standard Deviation	47.08672
Variance	2217.159
Coefficient of Variation	2.170716
Skewness	3.154503

Gamma Statistics	
k hat	0.470433
k star (bias corrected)	0.45134
Theta hat	46.11029
Theta star	48.0609
nu hat	36.69376
nu star	35.2045
Approx.Chi Square Value (.05)	22.62699
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	22.22834

Log-transformed Statistics	
Minimum of log data	-0.020203
Maximum of log data	5.347108
Mean of log data	1.713816
Standard Deviation of log data	1.452252
Variance of log data	2.109035

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.483072
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	34.40374

Gamma Distribution Test	
A-D Test Statistic	6.791341
A-D 5% Critical Value	0.819521
K-S Test Statistic	0.436262
K-S 5% Critical Value	0.150058
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	33.74946
Adjusted Gamma UCL	34.35474

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.681016
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	31.80698
95% Chebyshev (MVUE) UCL	34.84327
97.5% Chebyshev (MVUE) UCL	43.37449
99% Chebyshev (MVUE) UCL	60.13242

95% Non-parametric UCLs	
CLT UCL	34.09384
Adj-CLT UCL (Adjusted for skewness)	38.16338
Mod-t UCL (Adjusted for skewness)	35.0385
Jackknife UCL	34.40374
Standard Bootstrap UCL	33.89349
Bootstrap-t UCL	50.35488
Hall's Bootstrap UCL	48.39717
Percentile Bootstrap UCL	35.03795
BCA Bootstrap UCL	38.07385
95% Chebyshev (Mean, Sd) UCL	54.5575
97.5% Chebyshev (Mean, Sd) UCL	68.77852
99% Chebyshev (Mean, Sd) UCL	96.71295

PRO-UCL OUTPUT

EPC Set: 2 **COPC: cis-1,2-Dichloroethene**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	16
Minimum	1.9
Maximum	2400
Mean	254.9923
Median	2.5
Standard Deviation	596.8307
Variance	356206.9
Coefficient of Variation	2.340583
Skewness	2.656743

Gamma Statistics	
k hat	0.239008
k star (bias corrected)	0.237717
Theta hat	1066.879
Theta star	1072.674
nu hat	18.64261
nu star	18.5419
Approx.Chi Square Value (.05)	9.782215
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	9.530598

Log-transformed Statistics	
Minimum of log data	0.641854
Maximum of log data	7.783224
Mean of log data	2.547833
Standard Deviation of log data	2.476129
Variance of log data	6.131217

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.494946
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	416.1179

Gamma Distribution Test	
A-D Test Statistic	6.174359
A-D 5% Critical Value	0.884718
K-S Test Statistic	0.382363
K-S 5% Critical Value	0.155279
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	483.3303
Adjusted Gamma UCL	496.0907

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.683075
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	1609.891
95% Chebyshev (MVUE) UCL	741.1622
97.5% Chebyshev (MVUE) UCL	971.1276
99% Chebyshev (MVUE) UCL	1422.85

95% Non-parametric UCLs	
CLT UCL	412.19
Adj-CLT UCL (Adjusted for skewness)	455.6326
Mod-t UCL (Adjusted for skewness)	422.8941
Jackknife UCL	416.1179
Standard Bootstrap UCL	412.4665
Bootstrap-t UCL	497.2664
Hall's Bootstrap UCL	422.4556
Percentile Bootstrap UCL	414.2256
BCA Bootstrap UCL	456.0513
95% Chebyshev (Mean, Sd) UCL	671.5697
97.5% Chebyshev (Mean, Sd) UCL	851.823
99% Chebyshev (Mean, Sd) UCL	1205.896

PRO-UCL OUTPUT

EPC Set: 2 **COPC: Methylene chloride**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	9
Minimum	2.5
Maximum	125
Mean	15.16667
Median	2.5
Standard Deviation	32.64032
Variance	1065.39
Coefficient of Variation	2.152109
Skewness	2.694743

Gamma Statistics	
k hat	0.52135
k star (bias corrected)	0.49834
Theta hat	29.09113
Theta star	30.43436
nu hat	40.66531
nu star	38.87054
Approx.Chi Square Value (.05)	25.5879
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	25.16193

Log-transformed Statistics	
Minimum of log data	0.916291
Maximum of log data	4.828314
Mean of log data	1.508598
Standard Deviation of log data	1.247254
Variance of log data	1.555642

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.447072
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	23.97853

Gamma Distribution Test	
A-D Test Statistic	9.64658
A-D 5% Critical Value	0.810883
K-S Test Statistic	0.437973
K-S 5% Critical Value	0.149253
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	23.03966
Adjusted Gamma UCL	23.4297

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.5259
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	16.89109
95% Chebyshev (MVUE) UCL	19.71264
97.5% Chebyshev (MVUE) UCL	24.1256
99% Chebyshev (MVUE) UCL	32.794

95% Non-parametric UCLs	
CLT UCL	23.76371
Adj-CLT UCL (Adjusted for skewness)	26.17355
Mod-t UCL (Adjusted for skewness)	24.35442
Jackknife UCL	23.97853
Standard Bootstrap UCL	23.87886
Bootstrap-t UCL	29.71267
Hall's Bootstrap UCL	23.89116
Percentile Bootstrap UCL	24.44615
BCA Bootstrap UCL	25.71795
95% Chebyshev (Mean, Sd) UCL	37.94903
97.5% Chebyshev (Mean, Sd) UCL	47.80698
99% Chebyshev (Mean, Sd) UCL	67.17101

PRO-UCL OUTPUT

EPC Set: 2 **COPC: Tetrachloroethene**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	13
Minimum	1.5
Maximum	2200
Mean	201.2718
Median	2.5
Standard Deviation	523.5359
Variance	274089.9
Coefficient of Variation	2.601139
Skewness	2.905615

Gamma Statistics	
k hat	0.237438
k star (bias corrected)	0.236267
Theta hat	847.683
Theta star	851.8823
nu hat	18.52013
nu star	18.42884
Approx.Chi Square Value (.05)	9.700094
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	9.449659

Log-transformed Statistics	
Minimum of log data	0.405465
Maximum of log data	7.696213
Mean of log data	2.288273
Standard Deviation of log data	2.300784
Variance of log data	5.293607

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.443767
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	342.6101

Gamma Distribution Test	
A-D Test Statistic	7.190638
A-D 5% Critical Value	0.885421
K-S Test Statistic	0.391013
K-S 5% Critical Value	0.155327
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	382.3886
Adjusted Gamma UCL	392.5227

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.660981
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	652.9734
95% Chebyshev (MVUE) UCL	374.6026
97.5% Chebyshev (MVUE) UCL	487.9959
99% Chebyshev (MVUE) UCL	710.735

95% Non-parametric UCLs	
CLT UCL	339.1645
Adj-CLT UCL (Adjusted for skewness)	380.8419
Mod-t UCL (Adjusted for skewness)	349.111
Jackknife UCL	342.6101
Standard Bootstrap UCL	338.9943
Bootstrap-t UCL	460.6989
Hall's Bootstrap UCL	333.2954
Percentile Bootstrap UCL	344.8846
BCA Bootstrap UCL	386.5923
95% Chebyshev (Mean, Sd) UCL	566.6907
97.5% Chebyshev (Mean, Sd) UCL	724.8077
99% Chebyshev (Mean, Sd) UCL	1035.398

PRO-UCL OUTPUT

EPC Set: 2 **COPC: trans-1,2-Dichloroethene**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	9
Minimum	2.5
Maximum	125
Mean	15.73846
Median	2.5
Standard Deviation	32.64826
Variance	1065.909
Coefficient of Variation	2.074425
Skewness	2.63957

Gamma Statistics	
k hat	0.523509
k star (bias corrected)	0.500333
Theta hat	30.06341
Theta star	31.45598
nu hat	40.83369
nu star	39.02597
Approx.Chi Square Value (.05)	25.71419
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	25.28709

Log-transformed Statistics	
Minimum of log data	0.916291
Maximum of log data	4.828314
Mean of log data	1.551361
Standard Deviation of log data	1.281866
Variance of log data	1.64318

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.46924
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	24.55247

Gamma Distribution Test	
A-D Test Statistic	9.134051
A-D 5% Critical Value	0.810675
K-S Test Statistic	0.445564
K-S 5% Critical Value	0.14923
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	23.88598
Adjusted Gamma UCL	24.28942

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.54352
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	18.86549
95% Chebyshev (MVUE) UCL	21.83158
97.5% Chebyshev (MVUE) UCL	26.80128
99% Chebyshev (MVUE) UCL	36.56329

95% Non-parametric UCLs	
CLT UCL	24.3376
Adj-CLT UCL (Adjusted for skewness)	26.69867
Mod-t UCL (Adjusted for skewness)	24.92075
Jackknife UCL	24.55247
Standard Bootstrap UCL	24.07664
Bootstrap-t UCL	29.90268
Hall's Bootstrap UCL	25.3423
Percentile Bootstrap UCL	24.98462
BCA Bootstrap UCL	26.43846
95% Chebyshev (Mean, Sd) UCL	38.52637
97.5% Chebyshev (Mean, Sd) UCL	48.38672
99% Chebyshev (Mean, Sd) UCL	67.75546

PRO-UCL OUTPUT

EPC Set: 2 **COPC: Trichloroethene**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	18
Minimum	1.3
Maximum	5800
Mean	516.5846
Median	2.5
Standard Deviation	1229.915
Variance	1512691
Coefficient of Variation	2.380859
Skewness	2.99613

Gamma Statistics	
k hat	0.212896
k star (bias corrected)	0.213613
Theta hat	2426.464
Theta star	2418.315
nu hat	16.60589
nu star	16.66185
Approx.Chi Square Value (.05)	8.429822
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	8.19834

Log-transformed Statistics	
Minimum of log data	0.262364
Maximum of log data	8.665613
Mean of log data	2.824245
Standard Deviation of log data	2.804826
Variance of log data	7.867051

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.499757
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	848.6232

Gamma Distribution Test	
A-D Test Statistic	5.61725
A-D 5% Critical Value	0.896399
K-S Test Statistic	0.362662
K-S 5% Critical Value	0.156076
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1021.048
Adjusted Gamma UCL	1049.878

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.713108
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	8033.944
95% Chebyshev (MVUE) UCL	2248.155
97.5% Chebyshev (MVUE) UCL	2971.334
99% Chebyshev (MVUE) UCL	4391.881

95% Non-parametric UCLs	
CLT UCL	840.5287
Adj-CLT UCL (Adjusted for skewness)	941.4892
Mod-t UCL (Adjusted for skewness)	864.371
Jackknife UCL	848.6232
Standard Bootstrap UCL	836.8012
Bootstrap-t UCL	1100.612
Hall's Bootstrap UCL	954.9715
Percentile Bootstrap UCL	845.0256
BCA Bootstrap UCL	931.7179
95% Chebyshev (Mean, Sd) UCL	1375.044
97.5% Chebyshev (Mean, Sd) UCL	1746.5
99% Chebyshev (Mean, Sd) UCL	2476.153

PRO-UCL OUTPUT

EPC Set: 2 **COPC: Vinyl chloride**

Raw Statistics	
Number of Valid Samples	39
Number of Unique Samples	11
Minimum	1.9
Maximum	250
Mean	28.98462
Median	5
Standard Deviation	57.34284
Variance	3288.201
Coefficient of Variation	1.978389
Skewness	2.570847

Gamma Statistics	
k hat	0.547604
k star (bias corrected)	0.522575
Theta hat	52.92985
Theta star	55.46499
nu hat	42.71314
nu star	40.76085
Approx.Chi Square Value (.05)	27.12775
Adjusted Level of Significance	0.0437
Adjusted Chi Square Value	26.68819

Log-transformed Statistics	
Minimum of log data	0.641854
Maximum of log data	5.521461
Mean of log data	2.222908
Standard Deviation of log data	1.27164
Variance of log data	1.617067

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.502001
Shapiro-Wilk 5% Critical Value	0.939
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	44.46539

Gamma Distribution Test	
A-D Test Statistic	8.423936
A-D 5% Critical Value	0.80835
K-S Test Statistic	0.444531
K-S 5% Critical Value	0.148978
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	43.55088
Adjusted Gamma UCL	44.26817

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.615895
Shapiro-Wilk 5% Critical Value	0.939
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	36.18598
95% Chebyshev (MVUE) UCL	41.98357
97.5% Chebyshev (MVUE) UCL	51.49424
99% Chebyshev (MVUE) UCL	70.17612

95% Non-parametric UCLs	
CLT UCL	44.088
Adj-CLT UCL (Adjusted for skewness)	48.12697
Mod-t UCL (Adjusted for skewness)	45.09539
Jackknife UCL	44.46539
Standard Bootstrap UCL	43.61971
Bootstrap-t UCL	52.09181
Hall's Bootstrap UCL	46.3297
Percentile Bootstrap UCL	43.62564
BCA Bootstrap UCL	48.99744
95% Chebyshev (Mean, Sd) UCL	69.00891
97.5% Chebyshev (Mean, Sd) UCL	86.32746
99% Chebyshev (Mean, Sd) UCL	120.3464

PRO-UCL OUTPUT

EPC Set: 2 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	25
Number of Unique Samples	5
Minimum	0.005
Maximum	0.046
Mean	0.00812
Median	0.005
Standard Deviation	0.008997
Variance	8.09E-05
Coefficient of Variation	1.107987
Skewness	3.57846

Gamma Statistics	
k hat	2.152229
k star (bias corrected)	1.920628
Theta hat	0.003773
Theta star	0.004228
nu hat	107.6114
nu star	96.0314
Approx.Chi Square Value (.05)	74.42403
Adjusted Level of Significance	0.0395
Adjusted Chi Square Value	73.12735

Log-transformed Statistics	
Minimum of log data	-5.298317
Maximum of log data	-3.079114
Mean of log data	-5.063378
Standard Deviation of log data	0.582411
Variance of log data	0.339203

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.41068
Shapiro-Wilk 5% Critical Value	0.918
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.011199

Gamma Distribution Test	
A-D Test Statistic	6.542375
A-D 5% Critical Value	0.755685
K-S Test Statistic	0.503247
K-S 5% Critical Value	0.176599
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.010477
Adjusted Gamma UCL	0.010663

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.470174
Shapiro-Wilk 5% Critical Value	0.918
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.009548
95% Chebyshev (MVUE) UCL	0.011415
97.5% Chebyshev (MVUE) UCL	0.013137
99% Chebyshev (MVUE) UCL	0.01652

95% Non-parametric UCLs	
CLT UCL	0.01108
Adj-CLT UCL (Adjusted for skewness)	0.012456
Mod-t UCL (Adjusted for skewness)	0.011413
Jackknife UCL	0.011199
Standard Bootstrap UCL	0.010986
Bootstrap-t UCL	0.016785
Hall's Bootstrap UCL	0.020959
Percentile Bootstrap UCL	0.01124
BCA Bootstrap UCL	0.01288
95% Chebyshev (Mean, Sd) UCL	0.015963
97.5% Chebyshev (Mean, Sd) UCL	0.019357
99% Chebyshev (Mean, Sd) UCL	0.026024

PRO-UCL OUTPUT

EPC Set: 3 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	13
Number of Unique Samples	2
Minimum	0.005
Maximum	0.011
Mean	0.005462
Median	0.005
Standard Deviation	0.001664
Variance	2.77E-06
Coefficient of Variation	0.304694
Skewness	3.605551

Gamma Statistics	
k hat	18.2535
k star (bias corrected)	14.09244
Theta hat	0.000299
Theta star	0.000388
nu hat	474.591
nu star	366.4033
Approx.Chi Square Value (.05)	323.0332
Adjusted Level of Significance	0.03009
Adjusted Chi Square Value	317.2293

Log-transformed Statistics	
Minimum of log data	-5.298317
Maximum of log data	-4.50986
Mean of log data	-5.237667
Standard Deviation of log data	0.218679
Variance of log data	0.04782

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.311121
Shapiro-Wilk 5% Critical Value	0.866
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.006284

Gamma Distribution Test	
A-D Test Statistic	4.489555
A-D 5% Critical Value	0.733402
K-S Test Statistic	0.538343
K-S 5% Critical Value	0.236213
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.006195
Adjusted Gamma UCL	0.006308

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.311121
Shapiro-Wilk 5% Critical Value	0.866
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.006114
95% Chebyshev (MVUE) UCL	0.006875
97.5% Chebyshev (MVUE) UCL	0.007499
99% Chebyshev (MVUE) UCL	0.008726

95% Non-parametric UCLs	
CLT UCL	0.006221
Adj-CLT UCL (Adjusted for skewness)	0.006714
Mod-t UCL (Adjusted for skewness)	0.006361
Jackknife UCL	0.006284
Standard Bootstrap UCL	N/R
Bootstrap-t UCL	N/R
Hall's Bootstrap UCL	N/A
Percentile Bootstrap UCL	N/R
BCA Bootstrap UCL	N/R
95% Chebyshev (Mean, Sd) UCL	0.007473
97.5% Chebyshev (Mean, Sd) UCL	0.008344
99% Chebyshev (Mean, Sd) UCL	0.010054

PRO-UCL OUTPUT

EPC Set: 3 **COPC: Lead**

Raw Statistics	
Number of Valid Samples	13
Number of Unique Samples	2
Minimum	0.0015
Maximum	0.068
Mean	0.006615
Median	0.0015
Standard Deviation	0.018444
Variance	0.00034
Coefficient of Variation	2.788013
Skewness	3.605551

Gamma Statistics	
k hat	0.528919
k star (bias corrected)	0.458143
Theta hat	0.012507
Theta star	0.01444
nu hat	13.75191
nu star	11.91172
Approx.Chi Square Value (.05)	5.167942
Adjusted Level of Significance	0.03009
Adjusted Chi Square Value	4.550723

Log-transformed Statistics	
Minimum of log data	-6.50229
Maximum of log data	-2.688248
Mean of log data	-6.208902
Standard Deviation of log data	1.057825
Variance of log data	1.118994

RECOMMENDATION

Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Shapiro-Wilk Test Statisitic	0.311121
Shapiro-Wilk 5% Critical Value	0.866
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	0.015732

Gamma Distribution Test	
A-D Test Statistic	4.696144
A-D 5% Critical Value	0.787678
K-S Test Statistic	0.570776
K-S 5% Critical Value	0.249354
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	0.015248
Adjusted Gamma UCL	0.017316

Lognormal Distribution Test	
Shapiro-Wilk Test Statisitic	0.311121
Shapiro-Wilk 5% Critical Value	0.866
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	0.008689
95% Chebyshev (MVUE) UCL	0.007903
97.5% Chebyshev (MVUE) UCL	0.009889
99% Chebyshev (MVUE) UCL	0.01379

95% Non-parametric UCLs	
CLT UCL	0.015029
Adj-CLT UCL (Adjusted for skewness)	0.020495
Mod-t UCL (Adjusted for skewness)	0.016585
Jackknife UCL	0.015732
Standard Bootstrap UCL	N/R
Bootstrap-t UCL	N/R
Hall's Bootstrap UCL	N/A
Percentile Bootstrap UCL	N/R
BCA Bootstrap UCL	N/R
95% Chebyshev (Mean, Sd) UCL	0.028913
97.5% Chebyshev (Mean, Sd) UCL	0.038561
99% Chebyshev (Mean, Sd) UCL	0.057513

PRO-UCL OUTPUT			
EPC Set: 3		**COPC:**	**Tetrachloroethene**
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	13	Shapiro-Wilk Test Statisitic	0.520468
Number of Unique Samples	4	Shapiro-Wilk 5% Critical Value	0.866
Minimum	0.73	Data not normal at 5% significance level	
Maximum	2.5		
Mean	2.207692	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student	2.521595
Standard Deviation	0.635022		
Variance	0.403253	Gamma Distribution Test	
Coefficient of Variation	0.28764	A-D Test Statistic	3.272353
Skewness	-2.065982	A-D 5% Critical Value	0.734677
		K-S Test Statistic	0.451473
Gamma Statistics		K-S 5% Critical Value	0.237017
k hat	7.860275	Data do not follow gamma distribution	
k star (bias corrected)	6.097648	at 5% significance level	
Theta hat	0.280867		
Theta star	0.362056	95% UCLs (Assuming Gamma Distribution)	
nu hat	204.3672	Approximate Gamma UCL	2.68359
nu star	158.5388	Adjusted Gamma UCL	2.760451
Approx.Chi Square Value (.05)	130.4242		
Adjusted Level of Significance	0.03009	Lognormal Distribution Test	
Adjusted Chi Square Value	126.7927	Shapiro-Wilk Test Statisitic	0.505089
		Shapiro-Wilk 5% Critical Value	0.866
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.314711		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.72699	95% H-UCL	2.914411
Standard Deviation of log data	0.4276	95% Chebyshev (MVUE) UCL	3.4357
Variance of log data	0.182842	97.5% Chebyshev (MVUE) UCL	3.948805
		99% Chebyshev (MVUE) UCL	4.9567
		95% Non-parametric UCLs	
		CLT UCL	2.497389
		Adj-CLT UCL (Adjusted for skewness)	2.389556
		Mod-t U	2.504775
		Jackknife UCL	2.521595
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
R		Hall's Bootstrap UCL	N/R
Data		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Stu		95% Chebyshev (Mean, Sd) UCL	2.975396
or Modif		97.5% Chebyshev (Mean, Sd) UCL	3.307582
		99% Chebyshev (Mean, Sd) UCL	3.960097
Recommer			

PRO-UCL OUTPUT			
EPC Set: 3		**COPC:**	**Trichloroethene**
Raw Statistics		Normal Distribution Test	
Number of Valid Samples	13	Shapiro-Wilk Test Statisitic	0.455816
Number of Unique Samples	3	Shapiro-Wilk 5% Critical Value	0.866
Minimum	0.64	Data not normal at 5% significance level	
Maximum	2.5		
Mean	2.229231	95% UCL (Assuming Normal Distribution)	
Median	2.5	Student	2.556567
Standard Deviation	0.662199		
Variance	0.438508	Gamma Distribution Test	
Coefficient of Variation	0.297053	A-D Test Statistic	3.746247
Skewness	-2.196613	A-D 5% Critical Value	0.735092
		K-S Test Statistic	0.513732
Gamma Statistics		K-S 5% Critical Value	0.237157
k hat	6.912308	Data do not follow gamma distribution	
k star (bias corrected)	5.368442	at 5% significance level	
Theta hat	0.322502		
Theta star	0.415247	95% UCLs (Assuming Gamma Distribution)	
nu hat	179.72	Approximate Gamma UCL	2.746896
nu star	139.5795	Adjusted Gamma UCL	2.831227
Approx.Chi Square Value (.05)	113.2751		
Adjusted Level of Significance	0.03009	Lognormal Distribution Test	
Adjusted Chi Square Value	109.9011	Shapiro-Wilk Test Statisitic	0.462341
		Shapiro-Wilk 5% Critical Value	0.866
Log-transformed Statistics		Data not lognormal at 5% significance level	
Minimum of log data	-0.446287		
Maximum of log data	0.916291	95% UCLs (Assuming Lognormal Distribution)	
Mean of log data	0.727581	95% H-UCL	3.043978
Standard Deviation of log data	0.463966	95% Chebyshev (MVUE) UCL	3.595365
Variance of log data	0.215265	97.5% Chebyshev (MVUE) UCL	4.162485
		99% Chebyshev (MVUE) UCL	5.276482
		95% Non-parametric UCLs	
		CLT UCL	2.531326
		Adj-CLT UCL (Adjusted for skewness)	2.411768
		Mod-t U	2.537919
		Jackknife UCL	2.556567
		Standard Bootstrap UCL	N/R
		Bootstrap-t UCL	N/R
R		Hall's Bootstrap UCL	N/R
Data		Percentile Bootstrap UCL	N/R
		BCA Bootstrap UCL	N/R
Use Stu		95% Chebyshev (Mean, Sd) UCL	3.02979
or Modif		97.5% Chebyshev (Mean, Sd) UCL	3.376193
		99% Chebyshev (Mean, Sd) UCL	4.056635
Recommer			

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	66
Minimum	1.1
Maximum	160
Mean	13.76198
Median	6.9
Standard Deviation	22.02892
Variance	485.2734
Coefficient of Variation	1.600708
Skewness	4.169357

Gamma Statistics	
k hat	1.219503
k star (bias corrected)	1.194777
Theta hat	11.28491
Theta star	11.51845
nu hat	295.1198
nu star	289.1361
Approx.Chi Square Value (.05)	250.7432
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	250.3161

Log-transformed Statistics	
Minimum of log data	0.09531
Maximum of log data	5.075174
Mean of log data	2.158867
Standard Deviation of log data	0.782121
Variance of log data	0.611713

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.343277
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	17.08164

Gamma Distribution Test	
A-D Test Statistic	14.7067
A-D 5% Critical Value	0.77743
K-S Test Statistic	0.269444
K-S 5% Critical Value	0.08613
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	15.86917
Adjusted Gamma UCL	15.89625

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.194467
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	13.57159
95% Chebyshev (MVUE) UCL	15.82992
97.5% Chebyshev (MVUE) UCL	17.60752
99% Chebyshev (MVUE) UCL	21.09928

95% Non-parametric UCLs	
CLT UCL	17.05602
Adj-CLT UCL (Adjusted for skewness)	17.86708
Mod-t UCL (Adjusted for skewness)	17.20815
Jackknife UCL	17.08164
Standard Bootstrap UCL	17.01987
Bootstrap-t UCL	18.53022
Hall's Bootstrap UCL	18.15741
Percentile Bootstrap UCL	17.35289
BCA Bootstrap UCL	18.10496
95% Chebyshev (Mean, Sd) UCL	22.49124
97.5% Chebyshev (Mean, Sd) UCL	26.2684
99% Chebyshev (Mean, Sd) UCL	33.68789

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Chromium Total**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	39
Minimum	4.9
Maximum	280
Mean	19.58926
Median	13
Standard Deviation	28.11304
Variance	790.3431
Coefficient of Variation	1.435126
Skewness	7.249897

Gamma Statistics	
k hat	2.033024
k star (bias corrected)	1.988128
Theta hat	9.635526
Theta star	9.853116
nu hat	491.9918
nu star	481.127
Approx.Chi Square Value (.05)	431.255
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	430.6916

Log-transformed Statistics	
Minimum of log data	1.589235
Maximum of log data	5.63479
Mean of log data	2.709322
Standard Deviation of log data	0.57475
Variance of log data	0.330337

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.343072
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	23.82577

Gamma Distribution Test	
A-D Test Statistic	12.21095
A-D 5% Critical Value	0.765109
K-S Test Statistic	0.258153
K-S 5% Critical Value	0.085129
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	21.85463
Adjusted Gamma UCL	21.88322

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.17768
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	19.53808
95% Chebyshev (MVUE) UCL	22.01287
97.5% Chebyshev (MVUE) UCL	23.8841
99% Chebyshev (MVUE) UCL	27.55975

95% Non-parametric UCLs	
CLT UCL	23.79306
Adj-CLT UCL (Adjusted for skewness)	25.5929
Mod-t UCL (Adjusted for skewness)	24.1065
Jackknife UCL	23.82577
Standard Bootstrap UCL	23.78294
Bootstrap-t UCL	28.68543
Hall's Bootstrap UCL	40.41394
Percentile Bootstrap UCL	24.19587
BCA Bootstrap UCL	26.29008
95% Chebyshev (Mean, Sd) UCL	30.72943
97.5% Chebyshev (Mean, Sd) UCL	35.54979
99% Chebyshev (Mean, Sd) UCL	45.01846

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Lead**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	59
Minimum	3.7
Maximum	1400
Mean	91.82727
Median	42
Standard Deviation	157.3697
Variance	24765.21
Coefficient of Variation	1.713757
Skewness	5.580507

Gamma Statistics	
k hat	1.056192
k star (bias corrected)	1.035515
Theta hat	86.94186
Theta star	88.67789
nu hat	255.5984
nu star	250.5946
Approx.Chi Square Value (.05)	214.9352
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	214.5405

Log-transformed Statistics	
Minimum of log data	1.308333
Maximum of log data	7.244228
Mean of log data	3.976842
Standard Deviation of log data	0.915323
Variance of log data	0.837816

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.294172
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	115.5422

Gamma Distribution Test	
A-D Test Statistic	8.626368
A-D 5% Critical Value	0.781691
K-S Test Statistic	0.238091
K-S 5% Critical Value	0.086442
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	107.0621
Adjusted Gamma UCL	107.2591

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.164818
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	96.76538
95% Chebyshev (MVUE) UCL	115.0793
97.5% Chebyshev (MVUE) UCL	129.95
99% Chebyshev (MVUE) UCL	159.1608

95% Non-parametric UCLs	
CLT UCL	115.3591
Adj-CLT UCL (Adjusted for skewness)	123.1142
Mod-t UCL (Adjusted for skewness)	116.7518
Jackknife UCL	115.5422
Standard Bootstrap UCL	115.8059
Bootstrap-t UCL	128.7822
Hall's Bootstrap UCL	212.1003
Percentile Bootstrap UCL	117.8959
BCA Bootstrap UCL	124.0661
95% Chebyshev (Mean, Sd) UCL	154.1871
97.5% Chebyshev (Mean, Sd) UCL	181.1703
99% Chebyshev (Mean, Sd) UCL	234.1735

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Benzo(a)anthracene**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	62
Minimum	18
Maximum	6400
Mean	343.7025
Median	195
Standard Deviation	897.7673
Variance	805986.1
Coefficient of Variation	2.612048
Skewness	4.968086

Gamma Statistics	
k hat	0.576714
k star (bias corrected)	0.567925
Theta hat	595.9666
Theta star	605.1896
nu hat	139.5649
nu star	137.4379
Approx.Chi Square Value (.05)	111.3455
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	111.0643

Log-transformed Statistics	
Minimum of log data	2.890372
Maximum of log data	8.764053
Mean of log data	4.762089
Standard Deviation of log data	1.297203
Variance of log data	1.682735

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.401631
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	478.992

Gamma Distribution Test	
A-D Test Statistic	9.093765
A-D 5% Critical Value	0.811683
K-S Test Statistic	0.284805
K-S 5% Critical Value	0.088403
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	424.2447
Adjusted Gamma UCL	425.3189

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.157288
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	363.4831
95% Chebyshev (MVUE) UCL	449.2551
97.5% Chebyshev (MVUE) UCL	527.6949
99% Chebyshev (MVUE) UCL	681.7746

95% Non-parametric UCLs	
CLT UCL	477.9475
Adj-CLT UCL (Adjusted for skewness)	517.3341
Mod-t UCL (Adjusted for skewness)	485.1355
Jackknife UCL	478.992
Standard Bootstrap UCL	479.2015
Bootstrap-t UCL	555.7371
Hall's Bootstrap UCL	505.483
Percentile Bootstrap UCL	495.0579
BCA Bootstrap UCL	508.0413
95% Chebyshev (Mean, Sd) UCL	699.4549
97.5% Chebyshev (Mean, Sd) UCL	853.3893
99% Chebyshev (Mean, Sd) UCL	1155.764

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Benzo(a)pyrene**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	67
Minimum	16
Maximum	6600
Mean	372.7603
Median	200
Standard Deviation	955.1954
Variance	912398.3
Coefficient of Variation	2.562492
Skewness	4.794217

Gamma Statistics	
k hat	0.584474
k star (bias corrected)	0.575493
Theta hat	637.7704
Theta star	647.7238
nu hat	141.4428
nu star	139.2692
Approx.Chi Square Value (.05)	112.9954
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	112.7121

Log-transformed Statistics	
Minimum of log data	2.772589
Maximum of log data	8.794825
Mean of log data	4.859673
Standard Deviation of log data	1.288667
Variance of log data	1.660662

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.394106
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	516.704

Gamma Distribution Test	
A-D Test Statistic	9.394519
A-D 5% Critical Value	0.810948
K-S Test Statistic	0.282519
K-S 5% Critical Value	0.088355
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	459.4349
Adjusted Gamma UCL	460.5899

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.162986
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	395.1816
95% Chebyshev (MVUE) UCL	488.1792
97.5% Chebyshev (MVUE) UCL	572.9491
99% Chebyshev (MVUE) UCL	739.4632

95% Non-parametric UCLs	
CLT UCL	515.5928
Adj-CLT UCL (Adjusted for skewness)	556.0322
Mod-t UCL (Adjusted for skewness)	523.0117
Jackknife UCL	516.704
Standard Bootstrap UCL	514.3489
Bootstrap-t UCL	623.7915
Hall's Bootstrap UCL	533.4818
Percentile Bootstrap UCL	523.3802
BCA Bootstrap UCL	561.0083
95% Chebyshev (Mean, Sd) UCL	751.2695
97.5% Chebyshev (Mean, Sd) UCL	915.0507
99% Chebyshev (Mean, Sd) UCL	1236.767

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Benzo(b)fluoranthene**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	69
Minimum	20
Maximum	7800
Mean	513.6033
Median	200
Standard Deviation	1319.572
Variance	1741271
Coefficient of Variation	2.569244
Skewness	4.492003

Gamma Statistics	
k hat	0.544911
k star (bias corrected)	0.53691
Theta hat	942.5458
Theta star	956.5908
nu hat	131.8684
nu star	129.9323
Approx.Chi Square Value (.05)	104.5964
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	104.3242

Log-transformed Statistics	
Minimum of log data	2.995732
Maximum of log data	8.961879
Mean of log data	5.091079
Standard Deviation of log data	1.326174
Variance of log data	1.758737

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.355496
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	712.4569

Gamma Distribution Test	
A-D Test Statistic	9.551282
A-D 5% Critical Value	0.814693
K-S Test Statistic	0.28026
K-S 5% Critical Value	0.0886
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	638.0106
Adjusted Gamma UCL	639.6756

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.157124
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	529.9644
95% Chebyshev (MVUE) UCL	656.0897
97.5% Chebyshev (MVUE) UCL	772.7534
99% Chebyshev (MVUE) UCL	1001.917

95% Non-parametric UCLs	
CLT UCL	710.9218
Adj-CLT UCL (Adjusted for skewness)	763.2659
Mod-t UCL (Adjusted for skewness)	720.6215
Jackknife UCL	712.4569
Standard Bootstrap UCL	699.7163
Bootstrap-t UCL	818.8099
Hall's Bootstrap UCL	723.7971
Percentile Bootstrap UCL	724.4876
BCA Bootstrap UCL	755.5372
95% Chebyshev (Mean, Sd) UCL	1036.502
97.5% Chebyshev (Mean, Sd) UCL	1262.76
99% Chebyshev (Mean, Sd) UCL	1707.201

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Indeno(1,2,3-cd)pyrene**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	51
Minimum	29
Maximum	5800
Mean	390.595
Median	205
Standard Deviation	919.3517
Variance	845207.5
Coefficient of Variation	2.353721
Skewness	4.906216

Gamma Statistics	
k hat	0.843338
k star (bias corrected)	0.827938
Theta hat	463.1539
Theta star	471.7685
nu hat	204.0877
nu star	200.361
Approx.Chi Square Value (.05)	168.6035
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	168.2551

Log-transformed Statistics	
Minimum of log data	3.367296
Maximum of log data	8.665613
Mean of log data	5.268742
Standard Deviation of log data	0.942684
Variance of log data	0.888654

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.418838
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	529.1372

Gamma Distribution Test	
A-D Test Statistic	18.18893
A-D 5% Critical Value	0.790753
K-S Test Statistic	0.361779
K-S 5% Critical Value	0.087036
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	464.1661
Adjusted Gamma UCL	465.1272

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.263431
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	363.9004
95% Chebyshev (MVUE) UCL	434.3588
97.5% Chebyshev (MVUE) UCL	491.9708
99% Chebyshev (MVUE) UCL	605.1384

95% Non-parametric UCLs	
CLT UCL	528.0677
Adj-CLT UCL (Adjusted for skewness)	567.8989
Mod-t UCL (Adjusted for skewness)	535.3501
Jackknife UCL	529.1372
Standard Bootstrap UCL	529.3988
Bootstrap-t UCL	616.4133
Hall's Bootstrap UCL	527.9767
Percentile Bootstrap UCL	530.314
BCA Bootstrap UCL	572.2479
95% Chebyshev (Mean, Sd) UCL	754.9006
97.5% Chebyshev (Mean, Sd) UCL	912.5359
99% Chebyshev (Mean, Sd) UCL	1222.18

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Aroclor-1254 (PCB-1254)**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	30
Minimum	18
Maximum	540
Mean	35.46694
Median	21
Standard Deviation	56.56662
Variance	3199.782
Coefficient of Variation	1.594911
Skewness	6.693967

Gamma Statistics	
k hat	1.752358
k star (bias corrected)	1.714421
Theta hat	20.23955
Theta star	20.68742
nu hat	424.0707
nu star	414.8899
Approx.Chi Square Value (.05)	368.6629
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	368.1427

Log-transformed Statistics	
Minimum of log data	2.890372
Maximum of log data	6.291569
Mean of log data	3.256911
Standard Deviation of log data	0.585901
Variance of log data	0.34328

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.426748
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	43.99128

Gamma Distribution Test	
A-D Test Statistic	27.54606
A-D 5% Critical Value	0.767692
K-S Test Statistic	0.442245
K-S 5% Critical Value	0.085368
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	39.91418
Adjusted Gamma UCL	39.97057

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.416796
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	34.07927
95% Chebyshev (MVUE) UCL	38.47197
97.5% Chebyshev (MVUE) UCL	41.79988
99% Chebyshev (MVUE) UCL	48.33691

95% Non-parametric UCLs	
CLT UCL	43.92547
Adj-CLT UCL (Adjusted for skewness)	47.26926
Mod-t UCL (Adjusted for skewness)	44.51284
Jackknife UCL	43.99128
Standard Bootstrap UCL	43.7604
Bootstrap-t UCL	52.41964
Hall's Bootstrap UCL	75.25566
Percentile Bootstrap UCL	44.52479
BCA Bootstrap UCL	47.71074
95% Chebyshev (Mean, Sd) UCL	57.88223
97.5% Chebyshev (Mean, Sd) UCL	67.58134
99% Chebyshev (Mean, Sd) UCL	86.63337

PRO-UCL OUTPUT

EPC Set: 4 **COPC: Aroclor-1260 (PCB-1260)**

Raw Statistics	
Number of Valid Samples	121
Number of Unique Samples	36
Minimum	3.6
Maximum	560
Mean	40.34215
Median	21
Standard Deviation	76.63051
Variance	5872.235
Coefficient of Variation	1.899515
Skewness	4.746606

Gamma Statistics	
k hat	1.194154
k star (bias corrected)	1.170056
Theta hat	33.78304
Theta star	34.47881
nu hat	288.9852
nu star	283.1536
Approx.Chi Square Value (.05)	245.1725
Adjusted Level of Significance	0.048017
Adjusted Chi Square Value	244.7503

Log-transformed Statistics	
Minimum of log data	1.280934
Maximum of log data	6.327937
Mean of log data	3.223484
Standard Deviation of log data	0.715399
Variance of log data	0.511795

RECOMMENDATION

Data are Non-parametric (0.05)

Use 95% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.421691
Lilliefors 5% Critical Value	0.080545
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	51.89002

Gamma Distribution Test	
A-D Test Statistic	26.87837
A-D 5% Critical Value	0.778091
K-S Test Statistic	0.422773
K-S 5% Critical Value	0.086178
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	46.59179
Adjusted Gamma UCL	46.67217

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.375391
Lilliefors 5% Critical Value	0.080545
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	36.86411
95% Chebyshev (MVUE) UCL	42.54377
97.5% Chebyshev (MVUE) UCL	46.95283
99% Chebyshev (MVUE) UCL	55.61358

95% Non-parametric UCLs	
CLT UCL	51.80087
Adj-CLT UCL (Adjusted for skewness)	55.01291
Mod-t UCL (Adjusted for skewness)	52.39103
Jackknife UCL	51.89002
Standard Bootstrap UCL	51.68483
Bootstrap-t UCL	58.09275
Hall's Bootstrap UCL	53.59611
Percentile Bootstrap UCL	52.23306
BCA Bootstrap UCL	56.88182
95% Chebyshev (Mean, Sd) UCL	70.70803
97.5% Chebyshev (Mean, Sd) UCL	83.84736
99% Chebyshev (Mean, Sd) UCL	109.6571

PRO-UCL OUTPUT

EPC Set: 5 **COPC: Tetrachloroethene**

Raw Statistics	
Number of Valid Samples	394
Number of Unique Samples	111
Minimum	1.1
Maximum	6700
Mean	114.4041
Median	3.15
Standard Deviation	671.542
Variance	450968.6
Coefficient of Variation	5.869914
Skewness	7.335858

Gamma Statistics	
k hat	0.240833
k star (bias corrected)	0.240691
Theta hat	475.0345
Theta star	475.3141
nu hat	189.7765
nu star	189.6649
Approx.Chi Square Value (.05)	158.7995
Adjusted Level of Significance	0.049391
Adjusted Chi Square Value	158.6969

Log-transformed Statistics	
Minimum of log data	0.09531
Maximum of log data	8.809863
Mean of log data	1.77265
Standard Deviation of log data	1.504124
Variance of log data	2.262389

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.457736
Lilliefors 5% Critical Value	0.044636
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	170.1839

Gamma Distribution Test	
A-D Test Statistic	106.9248
A-D 5% Critical Value	0.898281
K-S Test Statistic	0.412217
K-S 5% Critical Value	0.050129
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	136.6404
Adjusted Gamma UCL	136.7288

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.366711
Lilliefors 5% Critical Value	0.044636
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	22.13462
95% Chebyshev (MVUE) UCL	26.75983
97.5% Chebyshev (MVUE) UCL	30.49234
99% Chebyshev (MVUE) UCL	37.82414

95% Non-parametric UCLs	
CLT UCL	170.0524
Adj-CLT UCL (Adjusted for skewness)	183.4125
Mod-t UCL (Adjusted for skewness)	172.2678
Jackknife UCL	170.1839
Standard Bootstrap UCL	170.1848
Bootstrap-t UCL	191.2453
Hall's Bootstrap UCL	178.3586
Percentile Bootstrap UCL	168.7027
BCA Bootstrap UCL	182.4839
95% Chebyshev (Mean, Sd) UCL	261.8734
97.5% Chebyshev (Mean, Sd) UCL	325.6836
99% Chebyshev (Mean, Sd) UCL	451.0262

PRO-UCL OUTPUT

EPC Set: 5 **COPC: Trichloroethene**

Raw Statistics	
Number of Valid Samples	394
Number of Unique Samples	85
Minimum	1.2
Maximum	1600
Mean	21.48553
Median	3.15
Standard Deviation	124.8507
Variance	15587.7
Coefficient of Variation	5.810921
Skewness	10.81018

Gamma Statistics	
k hat	0.40539
k star (bias corrected)	0.403996
Theta hat	52.99963
Theta star	53.1826
nu hat	319.4475
nu star	318.3485
Approx.Chi Square Value (.05)	278.0036
Adjusted Level of Significance	0.049391
Adjusted Chi Square Value	277.8668

Log-transformed Statistics	
Minimum of log data	0.182322
Maximum of log data	7.377759
Mean of log data	1.447654
Standard Deviation of log data	1.019002
Variance of log data	1.038365

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.438842
Lilliefors 5% Critical Value	0.044636
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	31.85592

Gamma Distribution Test	
A-D Test Statistic	112.8984
A-D 5% Critical Value	0.845795
K-S Test Statistic	0.458045
K-S 5% Critical Value	0.048858
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	24.60359
Adjusted Gamma UCL	24.6157

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.392393
Lilliefors 5% Critical Value	0.044636
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	7.970112
95% Chebyshev (MVUE) UCL	9.09004
97.5% Chebyshev (MVUE) UCL	9.936512
99% Chebyshev (MVUE) UCL	11.59924

95% Non-parametric UCLs	
CLT UCL	31.83148
Adj-CLT UCL (Adjusted for skewness)	35.49171
Mod-t UCL (Adjusted for skewness)	32.42684
Jackknife UCL	31.85592
Standard Bootstrap UCL	32.11991
Bootstrap-t UCL	44.76216
Hall's Bootstrap UCL	77.59387
Percentile Bootstrap UCL	32.47817
BCA Bootstrap UCL	36.70685
95% Chebyshev (Mean, Sd) UCL	48.90252
97.5% Chebyshev (Mean, Sd) UCL	60.76588
99% Chebyshev (Mean, Sd) UCL	84.06914

PRO-UCL OUTPUT

EPC Set: 5 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	394
Number of Unique Samples	92
Minimum	1.1
Maximum	24
Mean	6.479949
Median	6.65
Standard Deviation	2.590004
Variance	6.708121
Coefficient of Variation	0.399695
Skewness	1.342517

Gamma Statistics	
k hat	5.869157
k star (bias corrected)	5.82616
Theta hat	1.104068
Theta star	1.112216
nu hat	4624.896
nu star	4591.014
Approx.Chi Square Value (.05)	4434.511
Adjusted Level of Significance	0.049391
Adjusted Chi Square Value	4433.956

Log-transformed Statistics	
Minimum of log data	0.09531
Maximum of log data	3.178054
Mean of log data	1.781109
Standard Deviation of log data	0.448761
Variance of log data	0.201386

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.096445
Lilliefors 5% Critical Value	0.044636
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	6.695081

Gamma Distribution Test	
A-D Test Statistic	8.231712
A-D 5% Critical Value	0.756666
K-S Test Statistic	0.124452
K-S 5% Critical Value	0.045713
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	6.70864
Adjusted Gamma UCL	6.709481

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.151928
Lilliefors 5% Critical Value	0.044636
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	6.832298
95% Chebyshev (MVUE) UCL	7.241373
97.5% Chebyshev (MVUE) UCL	7.534697
99% Chebyshev (MVUE) UCL	8.110874

95% Non-parametric UCLs	
CLT UCL	6.694574
Adj-CLT UCL (Adjusted for skewness)	6.704004
Mod-t UCL (Adjusted for skewness)	6.696552
Jackknife UCL	6.695081
Standard Bootstrap UCL	6.694171
Bootstrap-t UCL	6.712185
Hall's Bootstrap UCL	6.70564
Percentile Bootstrap UCL	6.70736
BCA Bootstrap UCL	6.713706
95% Chebyshev (Mean, Sd) UCL	7.048709
97.5% Chebyshev (Mean, Sd) UCL	7.294812
99% Chebyshev (Mean, Sd) UCL	7.778234

PRO-UCL OUTPUT

EPC Set: 5 **COPC: Lead**

Raw Statistics	
Number of Valid Samples	394
Number of Unique Samples	48
Minimum	3.8
Maximum	680
Mean	22.64822
Median	19
Standard Deviation	35.50207
Variance	1260.397
Coefficient of Variation	1.567543
Skewness	16.43094

Gamma Statistics	
k hat	3.2451
k star (bias corrected)	3.222083
Theta hat	6.979206
Theta star	7.029062
nu hat	2557.139
nu star	2539.002
Approx.Chi Square Value (.05)	2422.913
Adjusted Level of Significance	0.049391
Adjusted Chi Square Value	2422.503

Log-transformed Statistics	
Minimum of log data	1.335001
Maximum of log data	6.522093
Mean of log data	2.958162
Standard Deviation of log data	0.434443
Variance of log data	0.188741

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.348633
Lilliefors 5% Critical Value	0.044636
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	25.59711

Gamma Distribution Test	
A-D Test Statistic	1.8E+308
A-D 5% Critical Value	0.759747
K-S Test Statistic	0.20612
K-S 5% Critical Value	0.04589
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	23.73337
Adjusted Gamma UCL	23.73739

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.120609
Lilliefors 5% Critical Value	0.044636
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	21.9987
95% Chebyshev (MVUE) UCL	23.27344
97.5% Chebyshev (MVUE) UCL	24.18649
99% Chebyshev (MVUE) UCL	25.97999

95% Non-parametric UCLs	
CLT UCL	25.59016
Adj-CLT UCL (Adjusted for skewness)	27.17213
Mod-t UCL (Adjusted for skewness)	25.84386
Jackknife UCL	25.59711
Standard Bootstrap UCL	25.647
Bootstrap-t UCL	30.55666
Hall's Bootstrap UCL	36.63215
Percentile Bootstrap UCL	26.11066
BCA Bootstrap UCL	28.04188
95% Chebyshev (Mean, Sd) UCL	30.44441
97.5% Chebyshev (Mean, Sd) UCL	33.81783
99% Chebyshev (Mean, Sd) UCL	40.44426

PRO-UCL OUTPUT

EPC Set: 6 **COPC: Tetrachloroethene**

Raw Statistics	
Number of Valid Samples	219
Number of Unique Samples	62
Minimum	1.2
Maximum	5100
Mean	37.68356
Median	3.1
Standard Deviation	350.353
Variance	122747.2
Coefficient of Variation	9.297236
Skewness	14.03911

Gamma Statistics	
k hat	0.320323
k star (bias corrected)	0.31898
Theta hat	117.6422
Theta star	118.1379
nu hat	140.3016
nu star	139.713
Approx.Chi Square Value (.05)	113.3954
Adjusted Level of Significance	0.048904
Adjusted Chi Square Value	113.2397

Log-transformed Statistics	
Minimum of log data	0.182322
Maximum of log data	8.536996
Mean of log data	1.49942
Standard Deviation of log data	1.085069
Variance of log data	1.177375

RECOMMENDATION

Data are Non-parametric (0.05)

Use 97.5% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.458532
Lilliefors 5% Critical Value	0.05987
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	76.79109

Gamma Distribution Test	
A-D Test Statistic	1.8E+308
A-D 5% Critical Value	0.864539
K-S Test Statistic	0.448251
K-S 5% Critical Value	0.066568
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	46.42942
Adjusted Gamma UCL	46.49329

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.400809
Lilliefors 5% Critical Value	0.05987
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	9.492135
95% Chebyshev (MVUE) UCL	11.23468
97.5% Chebyshev (MVUE) UCL	12.61896
99% Chebyshev (MVUE) UCL	15.33812

95% Non-parametric UCLs	
CLT UCL	76.62491
Adj-CLT UCL (Adjusted for skewness)	100.6233
Mod-t UCL (Adjusted for skewness)	80.53436
Jackknife UCL	76.79109
Standard Bootstrap UCL	75.39301
Bootstrap-t UCL	408.5542
Hall's Bootstrap UCL	228.1699
Percentile Bootstrap UCL	82.68607
BCA Bootstrap UCL	113.7616
95% Chebyshev (Mean, Sd) UCL	140.879
97.5% Chebyshev (Mean, Sd) UCL	185.5318
99% Chebyshev (Mean, Sd) UCL	273.2435

PRO-UCL OUTPUT

EPC Set: 6 **COPC: Trichloroethene**

Raw Statistics	
Number of Valid Samples	219
Number of Unique Samples	42
Minimum	1.4
Maximum	34
Mean	3.815982
Median	3.1
Standard Deviation	3.422932
Variance	11.71646
Coefficient of Variation	0.896999
Skewness	5.375091

Gamma Statistics	
k hat	3.744873
k star (bias corrected)	3.696618
Theta hat	1.018988
Theta star	1.03229
nu hat	1640.254
nu star	1619.119
Approx.Chi Square Value (.05)	1526.648
Adjusted Level of Significance	0.048904
Adjusted Chi Square Value	1526.062

Log-transformed Statistics	
Minimum of log data	0.336472
Maximum of log data	3.526361
Mean of log data	1.199781
Standard Deviation of log data	0.418526
Variance of log data	0.175164

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.454888
Lilliefors 5% Critical Value	0.05987
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	4.19806

Gamma Distribution Test	
A-D Test Statistic	48.10894
A-D 5% Critical Value	0.757703
K-S Test Statistic	0.434534
K-S 5% Critical Value	0.06176
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	4.047118
Adjusted Gamma UCL	4.048674

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.400561
Lilliefors 5% Critical Value	0.05987
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	3.808655
95% Chebyshev (MVUE) UCL	4.086494
97.5% Chebyshev (MVUE) UCL	4.287635
99% Chebyshev (MVUE) UCL	4.682737

95% Non-parametric UCLs	
CLT UCL	4.196437
Adj-CLT UCL (Adjusted for skewness)	4.286205
Mod-t UCL (Adjusted for skewness)	4.212062
Jackknife UCL	4.19806
Standard Bootstrap UCL	4.192813
Bootstrap-t UCL	4.335603
Hall's Bootstrap UCL	4.362926
Percentile Bootstrap UCL	4.213014
BCA Bootstrap UCL	4.290868
95% Chebyshev (Mean, Sd) UCL	4.824196
97.5% Chebyshev (Mean, Sd) UCL	5.260452
99% Chebyshev (Mean, Sd) UCL	6.117391

PRO-UCL OUTPUT

EPC Set: 6 **COPC: Arsenic**

Raw Statistics	
Number of Valid Samples	219
Number of Unique Samples	68
Minimum	1.9
Maximum	17
Mean	6.793607
Median	6.9
Standard Deviation	1.817311
Variance	3.302619
Coefficient of Variation	0.267503
Skewness	0.653345

Gamma Statistics	
k hat	12.76912
k star (bias corrected)	12.59725
Theta hat	0.532034
Theta star	0.539293
nu hat	5592.875
nu star	5517.593
Approx.Chi Square Value (.05)	5345.912
Adjusted Level of Significance	0.048904
Adjusted Chi Square Value	5344.809

Log-transformed Statistics	
Minimum of log data	0.641854
Maximum of log data	2.833213
Mean of log data	1.876314
Standard Deviation of log data	0.297107
Variance of log data	0.088272

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.105288
Lilliefors 5% Critical Value	0.05987
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	6.996461

Gamma Distribution Test	
A-D Test Statistic	6.030032
A-D 5% Critical Value	0.751741
K-S Test Statistic	0.143977
K-S 5% Critical Value	0.061358
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	7.011781
Adjusted Gamma UCL	7.013228

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.164421
Lilliefors 5% Critical Value	0.05987
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	7.063436
95% Chebyshev (MVUE) UCL	7.432196
97.5% Chebyshev (MVUE) UCL	7.69597
99% Chebyshev (MVUE) UCL	8.214104

95% Non-parametric UCLs	
CLT UCL	6.995599
Adj-CLT UCL (Adjusted for skewness)	7.001393
Mod-t UCL (Adjusted for skewness)	6.997365
Jackknife UCL	6.996461
Standard Bootstrap UCL	6.99477
Bootstrap-t UCL	6.996355
Hall's Bootstrap UCL	7.003781
Percentile Bootstrap UCL	6.997717
BCA Bootstrap UCL	6.981279
95% Chebyshev (Mean, Sd) UCL	7.328891
97.5% Chebyshev (Mean, Sd) UCL	7.560509
99% Chebyshev (Mean, Sd) UCL	8.015477

PRO-UCL OUTPUT

EPC Set: 6 **COPC: Lead**

Raw Statistics	
Number of Valid Samples	219
Number of Unique Samples	43
Minimum	3.8
Maximum	120
Mean	23.93973
Median	20
Standard Deviation	15.7579
Variance	248.3113
Coefficient of Variation	0.658232
Skewness	3.896439

Gamma Statistics	
k hat	4.403043
k star (bias corrected)	4.345772
Theta hat	5.437086
Theta star	5.50874
nu hat	1928.533
nu star	1903.448
Approx.Chi Square Value (.05)	1803.089
Adjusted Level of Significance	0.048904
Adjusted Chi Square Value	1802.451

Log-transformed Statistics	
Minimum of log data	1.335001
Maximum of log data	4.787492
Mean of log data	3.057705
Standard Deviation of log data	0.444363
Variance of log data	0.197458

RECOMMENDATION

Data are Non-parametric (0.05)

Use Student's-t UCL
or Modified-t UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.247075
Lilliefors 5% Critical Value	0.05987
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	25.69867

Gamma Distribution Test	
A-D Test Statistic	10.53479
A-D 5% Critical Value	0.756587
K-S Test Statistic	0.168202
K-S 5% Critical Value	0.061675
Data do not follow gamma distribution	
at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	25.2722
Adjusted Gamma UCL	25.28115

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.125094
Lilliefors 5% Critical Value	0.05987
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	24.77361
95% Chebyshev (MVUE) UCL	26.68985
97.5% Chebyshev (MVUE) UCL	28.08089
99% Chebyshev (MVUE) UCL	30.81332

95% Non-parametric UCLs	
CLT UCL	25.6912
Adj-CLT UCL (Adjusted for skewness)	25.99077
Mod-t UCL (Adjusted for skewness)	25.7454
Jackknife UCL	25.69867
Standard Bootstrap UCL	25.65543
Bootstrap-t UCL	26.10835
Hall's Bootstrap UCL	26.11663
Percentile Bootstrap UCL	25.75525
BCA Bootstrap UCL	25.90776
95% Chebyshev (Mean, Sd) UCL	28.58117
97.5% Chebyshev (Mean, Sd) UCL	30.58952
99% Chebyshev (Mean, Sd) UCL	34.53455

Appendix B - Worksheets for Modeled EPC's

WORKSHEET 3.1
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

EPC Set: 1
Exposure Point: Shower Water/Bath Water to Indoor Air

Equation: H' x Concentration in water = Indoor Air Exposure Point Concentration

Parameters:	Value	Units	Definition
H'	Chemical-Specfic	L-water/L-air	Henry's Law Constant; describes the volatility of dilute species in water at 25°C.

Chemical Constituent of Potential Concern	Overburden Water Exposure Point Concentration ug/L-water	Henry's Law Constant H' L-water/L-air	Indoor Air Exposure Point Concentration ug/L-air	Indoor Air Exposure Point Concentration mg/m^3-air
1,1-Dichloroethene	1.64E+02	1.07E+00	1.76E+02	1.76E+02
cis-1,2-Dichloroethene	2.57E+03	1.67E-01	4.30E+02	4.30E+02
trans-1,2-Dichloroethene	1.24E+02	3.85E-01	4.78E+01	4.78E+01
Methylene chloride	1.93E+02	8.98E-02	1.73E+01	1.73E+01
Tetrachloroethene	2.93E+03	7.54E-01	2.21E+03	2.21E+03
Trichloroethene	3.32E+03	4.22E-01	1.40E+03	1.40E+03
Vinyl Chloride	2.29E+02	1.11E+00	2.54E+02	2.54E+02
Bis(2-ethylhexyl)phthalate	7.12E+00	4.18E-06	2.98E-05	2.98E-05

Note: Model assumes that the breathing zone is near or at the air/water interface where equilibrium exists.

WORKSHEET 3.2
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

EPC Set: 2
Exposure Point: Shower Water/Bath Water to Indoor Air

Equation: H' x Concentration in water = Indoor Air Exposure Point Concentration

Parameters:	Value	Units	Definition
H'	Chemical-Specfic	L-water/L-air	Henry's Law Constant; describes the volatility of dilute species in water at 25°C.

Chemical Constituent of Potential Concern	Bedrock Water Exposure Point Concentration ug/L-water	Henry's Law Constant H' L-water/L-air	Indoor Air Exposure Point Concentration ug/L-air	Indoor Air Exposure Point Concentration mg/m^3-air
1,1-Dichloroethene	1.05E+02	1.07E+00	1.12E+02	1.12E+02
cis-1,2-Dichloroethene	1.31E+03	1.67E-01	2.20E+02	2.20E+02
trans-1,2-Dichloroethene	7.40E+01	3.85E-01	2.85E+01	2.85E+01
Methylene chloride	7.34E+01	8.98E-02	6.59E+00	6.59E+00
Tetrachloroethene	1.15E+03	7.54E-01	8.64E+02	8.64E+02
Trichloroethene	2.72E+03	4.22E-01	1.15E+03	1.15E+03
Vinyl Chloride	1.32E+02	1.11E+00	1.46E+02	1.46E+02
Bis(2-ethylhexyl)phthalate	0.00E+00	4.18E-06	0.00E+00	0.00E+00

Note: Model assumes that the breathing zone is near or at the air/water interface where equilibrium exists.

WORKSHEET 3.3
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

EPC Set: 1
Exposure Point: Groundwater Vapor to Outdoor Air

Equations: VF x Concentration in water x CF2 = Outdoor Air Exposure Point Concentration
VF = H' x CF1 / (1 + (100 x Um x DELTAa x Lgw) / (DwsEFF x Wga))

Parameters:	Value	Units	Definition
VF	Calculated below	(mg/m^3-air)/(mg/L-water)	Volatization factor: models the outdoor air concentration of a contaminant from a groundwater source.
Um	4.69	m/s	Mean annual wind speed
DELTAa	200	cm	Ambient air mixing zone
Lgw	400	cm	Depth to groundwater
Wga	1500	cm	Dimension of soil source parallel to wind direction
CF1	1000	L/m^3	Conversion factor; liters to cubic meters
CF2	0.001	mg/ug	Coversion factor; micrograms to milligrams
DwsEFF	Calculated on Worksheet 3.7	cm^2/s	Effective diffusivity between groundwater and soil
H'	Chemical-Specfic	L-water/L-air	Henry's Law Constant, describes volatility of dilute species in water at 25°C.

Chemical Constituent of Potential Concern	Exposure Point Concentration ug/L-water	DwsEFF cm^2/s	Henry's Law Constant H' L-water/L-air	Volatization Factor VF (mg/m^3-air)/(mg/L-water)	Outdoor Air Exposure Point Concentration mg/m^3-air
1,1-Dichloroethene	1.64E+02	1.62E-02	1.07E+00	6.91E-04	1.14E-04
cis-1,2-Dichloroethene	2.57E+03	6.54E-02	1.67E-01	4.36E-04	1.12E-03
trans-1,2-Dichloroethene	1.24E+02	3.08E-02	3.85E-01	4.75E-04	5.90E-05
Methylene chloride	1.93E+02	1.17E-01	8.98E-02	4.19E-04	8.07E-05
Tetrachloroethene	2.93E+03	1.86E-02	7.54E-01	5.60E-04	1.64E-03
Trichloroethene	3.32E+03	2.93E-02	4.22E-01	4.94E-04	1.64E-03
Vinyl Chloride	2.29E+02	1.71E-02	1.11E+00	7.58E-04	1.74E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.33E+03	4.18E-06	3.57E-04	2.54E-06

Note: Model Source is ASTM E1739-95 (as cited in MRBCA)

WORKSHEET 3.4
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

EPC Set: 4
Exposure Point: Surface soil vapors to outdoor air

Equations: VF x Concentration in surface soil = Outdoor Air Exposure Point Concentration
VF= [(Q/C x (3.14 x DA x T)^(.5) x CF1) / (2 x rb x Da)]^-1

Parameters:	Value	Units	Definition
VF	Calculated below	m^3/kg-soil	Volatization factor: models the outdoor air concentration of a contaminant from a surface soil source.
Q/C	68.81	(g/m^2-s)/(kg/m^3)	Inverse of the mean concentration at the center of square source
Foc	0.006	g/g	Fractional organic carbon in soil
rb	1.5	g/cm^3	Dry soil bulk density
rs	2.65	g/cm^3	Soil particle density
n	0.43	L-pore/L-soil	Total soil porosity (1-rb/rs)
THETAw	0.15	L-water/L-soil	Volumetric water content in soil
THETAa	0.28	L-air/L-soil	Volumetric air content in soil
T	9.50E+08	s	Exposure Interval
CF1	0.0001	m^2/cm^2	Conversion factor; square centimeters to square meters
DA	Calculated on Worksheet 3.8	cm^2/s	Apparent diffusivity

Chemical Constituent of Potential Concern	Exposure Point Concentration mg/kg-soil	Apparent Diffusivity DA cm^2/s	Volatization Factor VF kg-soil/m^3-air	Outdoor Air Exposure Point Concentration mg/m^3-air
Benzo(a)anthracene	8.53E-01	1.05E-10	8.19E-08	6.99E-08
Benzo(a)pyrene	9.15E-01	2.02E-11	3.59E-08	3.28E-08
Benzo(b)fluoranthene	1.26E+00	5.23E-10	1.83E-07	2.31E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	3.87E-12	1.57E-08	1.19E-08
Aroclor-1254 (PCB-1254)	5.79E-02	3.79E-09	4.92E-07	2.85E-08
Aroclor-1260 (PCB-1260)	7.07E-02	4.23E-09	5.19E-07	3.67E-08

Note: Model Source is Soil Screening Guidance, EPA 1996.

WORKSHEET 3.5
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

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EPC Set: 4 & 5
Exposure Point: Surface soil or exposed subsurface soil to particulates in outdoor air

Equations: VF x Concentration in surface soil = Outdoor Air - Particulate Exposure Point Concentration
PEF = [Q/C x 3600/(.036 x (1-V) x (Um/Ut) x F(x))]^-1

Parameters:	Value	Units	Definition
PEF	Calculated below	m^3/kg soil	Particulate Emission Factor: models the outdoor air particulate concentration of a contaminant from a surface soil source.
Q/C:	(g/m^2-s)/(kg/m^3)	90.8	Inverse of mean concentration at center of 0.5-acre square source
V:	unitless	0.5	Fraction of vegetative cover
Um:	m/s	4.69	Mean annual wind speed
Ut:	m/s	11.32	Equivalent threshold value of windspeed
F(x):	unitless	0.194	Windspeed distribution function

Chemical Constituent of Potential Concern	Particulate Emission Factor PEF kg-soil/m^3-air
All Chemicals	7.60E-10

Note: Model Source is Soil Screening Guidance, EPA 1996.

WORKSHEET 3.6
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

EPC Set: 5
Exposure Point: Exposed subsurface soil vapors to outdoor air

Equations: VF x Concentration in subsurface soil = Outdoor Air Exposure Point Concentration
VF= [(Q/C x (3.14 x DA x T)^(.5) x CF1) / (2 x rs x Da)]^-1

Parameters:	Value	Units	Definition
VF	Calculated below	m^3/kg-soil	Volatization factor: models the outdoor air concentration of a contaminant from a subsurface soil source.
Q/C	68.81	(g/m^2-s)/(kg/m^3)	Inverse of the mean concentration at the center of square source
Foc	0.006	g/g	Fractional organic carbon in soil
rb	1.5	g/cm^3	Dry soil bulk density
rs	2.65	g/cm^3	Soil particle density
n	0.43	L-pore/L-soil	Total soil porosity (1-rb/rs)
THETAw	0.15	L-water/L-soil	Volumetric water content in soil
THETAa	0.28	L-air/L-soil	Volumetric air content in soil
T	9.50E+08	s	Exposure Interval
CF1	0.0001	m^2/cm^2	Conversion factor; square centimeters to square meters
DA	Calculated on Worksheet 3.8	cm^2/s	Apparent diffusivity

Chemical Constituent of Potential Concern	Exposure Point Concentration mg/kg-soil	Apparent Diffusivity DA cm^2/s	Volatization Factor VF kg-soil/m^3-air	Outdoor Air Exposure Point Concentration mg/m^3-air
Tetrachloroethene	3.26E-01	4.25E-04	2.91E-04	9.47E-05
Trichloroethene	6.08E-02	1.38E-03	5.24E-04	3.19E-05

Note: Model Source is Soil Screening Guidance, EPA 1996.

WORKSHEET 3.7
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

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Calculation of Effective Diffusivities
Intercalculation Worksheet

Parameters:	Value	Units	Definition
THETAw	0.15	cm^3-water/cm^3-total volume soil	Volumetric water content in soil
THETAa	0.28	cm^3-air/cm^3-total volume soil	Volumetric air content in soil
THETAt	0.43	cm^3/cm^3-total volume soil	Total porosity
hc	5	cm	Capillary fringe thickness
hv	400	cm	Thickness of vadose zone
Da	Chemical-Specfic	cm^2/s	Diffusivity in air
Dw	Chemical-Specfic	cm^2/s	Diffusivity in water
DwsEFF	Calculated below	cm^2/s	Effective diffusivity between groundwater and soil
DcrEFF	Calculated below	cm^2/s	Effective diffusivity through foundation cracks
DsEFF	Calculated below	cm^2/s	Effective diffusivity in soil
DcapEFF	Calculated below	cm^2/s	Effective diffusivity through capillary fringe
H'	Chemical-Specfic	L-water/L-air	Henry's Law Constant, describes volatility of dilute species in water at 25°C

DwsEFF Calculation

Equations: DwsEFF = (hc + hv) x ((hc/DcapEFF) + (hv/DsEFF))^-1

DcrEFF, DsEFF, DcapEff = Da x (THETAa^3.33)/(THETAt^2.0) + Dw x 1/H' x (THETAa^3.33)/(THETAt^2.0)

Chemical Constituent of Potential Concern	Diffusivity in Air Da cm^2/s	Diffusivity in Water Dw cm^2/s	Henry's Law Constant H' L-water/L-air	DcrEFF, DsEFF, DcapEFF cm^2/s	DwsEFF cm^2/s
1,1-Dichloroethene	9.00E-02	1.04E-05	1.07E+00	1.62E-02	1.62E-02
cis-1,2-Dichloroethene	8.84E-02	1.13E-05	1.67E-01	6.54E-02	6.54E-02
trans-1,2-Dichloroethene	7.03E-02	1.19E-05	3.85E-01	3.08E-02	3.08E-02
Methylene chloride	1.01E-01	1.17E-05	8.98E-02	1.17E-01	1.17E-01
Tetrachloroethene	7.20E-02	8.20E-06	7.54E-01	1.86E-02	1.86E-02
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	2.93E-02	2.93E-02
Vinyl Chloride	1.06E-01	1.23E-05	1.11E+00	1.71E-02	1.71E-02
Bis(2-ethylhexyl)phthalate	3.51E-02	3.66E-06	4.18E-06	2.33E+03	2.33E+03
Benzo(a)anthracene	5.10E-02	9.00E-06	1.37E-04	7.12E+01	7.12E+01
Benzo(a)pyrene	4.30E-02	9.00E-06	4.63E-05	2.11E+02	2.11E+02
Benzo(b)fluoranthene	2.50E-02	6.41E-06	4.55E-03	2.15E+00	2.15E+00
Indeno(1,2,3-cd)pyrene	2.45E-02	6.31E-06	6.56E-05	1.49E+02	1.49E+02
Aroclor-1254 (PCB-1254)	2.37E-02	6.08E-06	8.20E-02	1.21E-01	1.21E-01
Aroclor-1260 (PCB-1260)	2.26E-02	5.78E-06	1.89E-01	5.35E-02	5.35E-02

Note: Model Source is ASTM E1739-95 (as cited in MRBCA). Calculation assumes soil in vadose zone, capillary fringe, and foundation cracks have equivalent geotechnical parameters.

WORKSHEET 3.8
EXPOSURE POINT MODEL WORKSHEET
Westinghouse Electric Co. Hematite Site

DRAFT

Calculation of Apparent Diffusivity
Intercalculation Worksheet

Parameters:	Value	Units	Definition
rb	1.5	g/cm^3	Dry soil bulk density
rs	2.65	g/cm^3	Soil particle density
THETAt	0.43	L-pore/L-soil	Total soil porosity (1-rb/rs)
THETAw	0.15	L-water/L-soil	Volumetric water content in soil
THETAa	0.28	L-air/L-soil	Volumetric air content in soil
Da	Chemical-Specfic	cm^2/s	Diffusivity in air
Dw	Chemical-Specfic	cm^2/s	Diffusivity in water
Kd	Chemical-Specfic	cm^3/g	Soil-Water Partition Coefficient
H'	Chemical-Specfic	L-water/L-air	Henry's Law Constant, describes volatility of dilute species in water at 25°C

DA Calculation

Equation: DA = ((THETAa^3.33 x Da x H' + THETAw^3.33 x Dw)/ (THETAt)^2) / (rs x Kd + THETAw + THETAa x H')

Chemical Constituent of Potential Concern	Henry's Law Constant H' L-water/L-air	Diffusion Coefficient in Air Dair cm^2/s	Diffusion Coefficient in Water Dwater cm^2/s	Soil-Water Partition Coefficient Kd cm^3/g	Apparent Diffusivity DA cm^2/s
Benzo(a)anthracene	1.37E-04	5.10E-02	9.00E-06	2.22E+03	1.05E-10
Benzo(a)pyrene	4.63E-05	4.30E-02	9.00E-06	4.44E+03	2.02E-11
Benzo(b)fluoranthene	4.55E-03	2.50E-02	6.41E-06	6.29E+03	5.23E-10
Indeno(1,2,3-cd)pyrene	6.56E-05	2.45E-02	6.31E-06	1.78E+04	3.87E-12
Aroclor-1254 (PCB-1254)	8.20E-02	2.37E-02	6.08E-06	1.47E+04	3.79E-09
Aroclor-1260 (PCB-1260)	1.89E-01	2.26E-02	5.78E-06	2.90E+04	4.23E-09
Tetrachloroethene	7.54E-01	7.20E-02	8.20E-06	3.54E+00	4.25E-04
Trichloroethene	4.22E-01	7.90E-02	9.10E-06	5.93E-01	1.38E-03

Note: Model Source is Soil Screening Guidance, EPA 1996.

Appendix C - Intake Factor Worksheets

Worksheet 5.1
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal: Bath
Receptor Age:	**Child**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	6,600	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	3.62E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	4.22E+02	calculated

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Worksheet 5.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal: Bath
Receptor Age:	**Child**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	360	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	1.97E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	2.30E+01	calculated

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Worksheet 5.3
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Ingestion
Receptor Age:	**Child**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1999
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	5.48E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	6.39E-02	calculated

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Worksheet 5.4
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Tapwater
Exposure Medium:	Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Child**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Bath)	hours/day	0.75	EPA, 1997
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.49E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.74E-02	calculated

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Worksheet 5.5
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Child**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	16.4	EPA, 1991
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	3.26E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	3.80E-01	calculated

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Worksheet 5.6
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Child**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	5.57	EPA, 1991
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.11E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.29E-01	calculated

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Worksheet 5.7
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal: Shower
Receptor Age:	**Adult**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	18,000	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	8.45E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	2.47E+02	calculated

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Worksheet 5.8
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal: Shower
Receptor Age:	**Adult**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	800	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	3.76E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	1.10E+01	calculated

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EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.9
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Current or Future Resident**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	2	EPA, 1991
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	9.39E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	2.74E-02	calculated

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Worksheet 5.10
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Tapwater
Exposure Medium:	Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time	hours/day	0.167	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	6.53E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.91E-03	calculated

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Worksheet 5.11
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	16.4	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	6.42E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.87E-01	calculated

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Worksheet 5.12
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Current or Future Resident**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	2	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	7.82E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	2.28E-02	calculated

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Worksheet 5.13
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Surface Water
Exposure Medium:	Groundwater/Surface Water
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	800	EPA, 1997
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	2.80E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	7.83E+00	calculated

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EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24

Worksheet 5.14
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Surface Water
Exposure Medium:	Groundwater/Surface Water
Receptor Population:	**Construction/Utility Worker**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	3,300	EPA, 1997
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	4.15E-01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	2.91E+01	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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Worksheet 5.15
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1991
EF	Exposure Frequency	days/year	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	3.49E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	9.78E-03	calculated

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EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.16
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	250	EPA, 1997
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours/day	8	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	2.33E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	6.52E-02	calculated

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VA DEQ= Virginia Department of Environmental Quality VRP
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EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.17
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	250	EPA, 1997
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours/day	1.5	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	4.37E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.22E-02	calculated

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Worksheet 5.18
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Construction/Utility Worker**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	1.5	EPA, 1997
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
ET	Exposure Time (Outdoors)	hours/day	10	10-hour workday
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	1.89E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.32E-01	calculated

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Worksheet 5.19
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Recreational**
Exposure Route:	Inhalation
Receptor Age:	**Child**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	0.83	EPA, 1997
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	9.19E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.07E-02	calculated

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Worksheet 5.20
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Recreational**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	1.39	EPA, 1997
EF	Exposure Frequency	days/year	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	0.83	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	3.02E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	8.81E-03	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.21
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Visitor/Trespasser**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	2	VA DEQ
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	5.37E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.56E-03	calculated

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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.22
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	**Agricultural**
Exposure Route:	Inhalation
Receptor Age:	**Adult**

Intake Equation:
CDI=CA x IF
Intake Factor Equation:
IF=IR-A x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CA	Chemical Concentration in Air	mg/m^3		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m^3/hour	1.5	EPA, 1997
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	30	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	10	10-hour workday
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	m^3/kg-day	5.66E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m^3/kg-day	1.32E-01	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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Worksheet 5.23
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Resident, Recreational**
Exposure Route:	Dermal
Receptor Age:	**Child**
Swimming possible?	**Yes**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	6,600	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	1.24E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	1.45E+01	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.24
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Resident, Recreational**
Exposure Route:	Ingestion
Receptor Age:	**Child**
Swimming possible?	**Yes**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Vallue	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.05	VA DEQ
EF	Exposure Frequency	days/year	12	EPA, 1997
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time	hours	3	EPA, 1997
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	2.82E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	3.29E-04	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.25
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Resident, Recreational, Visitor/Trespasser**
Exposure Route:	Dermal
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	18,000	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	2.90E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	8.45E+00	calculated

MRBCA= Missouri Risk-Based Corrective Action
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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.26
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Resident, Recreational, Visitor/Trespasser**
Exposure Route:	Ingestion
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Vallue	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.05	VA DEQ
EF	Exposure Frequency	days/year	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time	hours	3	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	2.42E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	7.05E-05	calculated

MRBCA= Missouri Risk-Based Corrective Action
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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.27

VALUES USED FOR DAILY INTAKE CALCULATIONS

Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Ingestion
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:

CDI=CW x IF

Intake Factor Equation:

IF=IR-W x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Vallue	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	250	EPA, 2002
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	1.75E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.89E-05	calculated

MRBCA= Missouri Risk-Based Corrective Action

VA DEQ= Virginia Department of Environmental Quality VRP

EPA, 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.

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.

EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.

EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.28
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Construction Worker**
Exposure Route:	Dermal
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	18,000	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	2.90E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	8.45E+00	calculated

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EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.29
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Construction Worker**
Exposure Route:	Ingestion
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Vallue	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	1	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	6.29E-07	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.40E-05	calculated

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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.30
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Agricultural**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm^2-event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm2	3,300	EPA, 1997
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	30	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm^2/kg-day	1.25E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm^2/kg-day	2.91E+01	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24

Worksheet 5.31
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	**Agricultural**
Exposure Route:	Ingestion
Receptor Age:	**Adult**
Swimming possible?	**Yes**

Intake Equation:
CDI=CW x IF
Intake Factor Equation:
IF=IR-W x EF x ED x ET x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Vallue	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	225	EPA, 1997
ED	Exposure Duration	years	30	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	1.89E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.40E-05	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.32
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal
Receptor Age:	**Child**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	2,800	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	3.07E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	3.58E-05	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.33
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Current or Future Resident**
Exposure Route:	Ingestion
Receptor Age:	**Child**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA,1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.10E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	1.28E-05	calculated

MRBCA= Missouri Risk-Based Corrective Action
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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.34
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Current or Future Resident**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.87E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	5.47E-06	calculated

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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.35
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Current or Future Resident**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA,1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	4.70E-07	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	1.37E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.36
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	2.31E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	6.46E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.37
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Commercial/Industrial Worker**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA,1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	3.49E-07	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	9.78E-07	calculated

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EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.38
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Construction/Utility Worker**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	EPA, 2002
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.25E-07	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	8.72E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.39
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Construction/Utility Worker**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	330	EPA, 2002
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	225	MRBCA
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	4.15E-08	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	2.91E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.41
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Recreational**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.04E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	3.05E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.41
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Recreational**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA,1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	3.27E-08	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	9.54E-08	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.42
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Recreational**
Exposure Route:	Dermal
Receptor Age:	**Child**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	2,800	EPA, 2004
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.71E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	1.99E-05	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.43
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Recreational**
Exposure Route:	Ingestion
Receptor Age:	**Child**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA,1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	3.27E-08	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	9.54E-08	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.44
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Visitor/Trespasser**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.29E-07	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	3.75E-07	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.45
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Visitor/Trespasser**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA,1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	4.03E-09	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	1.17E-08	calculated

MRBCA= Missouri Risk-Based Corrective Action
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EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.46
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Agricultural**
Exposure Route:	Dermal
Receptor Age:	**Adult**

Intake Equation:
DAD=CS x ABS x IF
Intake Factor Equation:
IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm^2	0.3	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm2/day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	225	EPA, 1991
ED	Exposure Duration	years	30	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	3.74E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	8.72E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
EPA, 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.
EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.47
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	**Agricultural**
Exposure Route:	Ingestion
Receptor Age:	**Adult**

Intake Equation:
CDI = CS x IF
Intake Factor Equation:
IF= IR-S x FI x EF x ED x CF x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA,1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	30	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	days^-1	1.17E-06	calculated
IF-N	Intake Factor (Non-cancer)	days^-1	2.74E-06	calculated

MRBCA= Missouri Risk-Based Corrective Action
VA DEQ= Virginia Department of Environmental Quality VRP
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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Devloping Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Appendix D - Risk Calculation Worksheets

WORKSHEET 7.1 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Groundwater

Exposure Route: Dermal (Bath)

Receptor: Resident Child

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	3.98E-07	1.50E+00	5.98E-07	4.65E-06	3.00E-04	3.00E-04	1.55E-02	1.10E-08	1.00E-03				0.75	
Lead	8.01E+00	8.01E-06				2.53E-07				6.01E-10	1.00E-04				0.75	
1,1-Dichloroethene	1.64E+02	1.64E-04				1.16E-03	5.00E-02	5.00E-02	2.32E-02	2.75E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	0.75	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				1.21E-02	1.00E-02	1.00E-01	1.21E+00	2.86E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.75	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				5.83E-04	2.00E-02	2.00E-01	2.91E-02	1.38E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.75	1.0
Methylene chloride	1.93E+02	1.93E-04	3.32E-05	7.50E-03	2.49E-07	3.87E-04	6.00E-02	6.00E-02	6.45E-03	9.17E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	0.75	1.0
Tetrachloroethene	2.93E+03	2.93E-03	7.84E-03	5.40E-01	4.23E-03	9.15E-02	1.00E-02	1.00E-02	9.15E+00	2.17E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	0.75	1.0
Trichloroethene	3.32E+03	3.32E-03	2.50E-03	4.00E-01	1.00E-03	2.92E-02	3.00E-04	3.00E-04	9.74E+01	6.92E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	0.75	1.0
Vinyl Chloride	2.29E+02	2.29E-04	5.64E-05	1.50E+00	8.45E-05	6.57E-04	3.00E-03	3.00E-03	2.19E-01	1.56E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	0.75	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	4.80E-05	1.40E-02	6.72E-07	5.60E-04	2.00E-02	2.00E-02	2.80E-02	1.33E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	0.75	0.8
Total					5.32E-03				1.08E+02							

WORKSHEET 7.2 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Groundwater

Exposure Route: Dermal (Tap)

Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	2.90E-08	1.50E+00	4.35E-08	3.38E-07	3.00E-04	3.00E-04	1.13E-03	1.47E-08	1.00E-03				1	
Lead	8.01E+00	8.01E-06				1.84E-08				8.01E-10	1.00E-04				1	
1,1-Dichloroethene	1.64E+02	1.64E-04				7.54E-05	5.00E-02	5.00E-02	1.51E-03	3.27E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				7.84E-04	1.00E-02	1.00E-01	7.84E-02	3.41E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				3.79E-05	2.00E-02	2.00E-01	1.89E-03	1.64E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	1.93E+02	1.93E-04	2.19E-06	7.50E-03	1.64E-08	2.55E-05	6.00E-02	6.00E-02	4.26E-04	1.11E-06	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	2.93E+03	2.93E-03	4.94E-04	5.40E-01	2.67E-04	5.76E-03	1.00E-02	1.00E-02	5.76E-01	2.50E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	3.32E+03	3.32E-03	1.58E-04	4.00E-01	6.31E-05	1.84E-03	3.00E-04	3.00E-04	6.13E+00	8.00E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl Chloride	2.29E+02	2.29E-04	3.70E-06	1.50E+00	5.54E-06	4.31E-05	3.00E-03	3.00E-03	1.44E-02	1.87E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	3.02E-06	1.40E-02	4.23E-08	3.53E-05	2.00E-02	2.00E-02	1.76E-03	1.53E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					3.35E-04				6.81E+00							

WORKSHEET 7.3 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Groundwater

Exposure Route: Dermal (Shower)

Receptor: Resident Adult

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	7.24E-07	1.50E+00	1.09E-06	2.11E-06	3.00E-04	3.00E-04	7.04E-03	8.56E-09	1.00E-03				0.583	
Lead	8.01E+00	8.01E-06				1.15E-07				4.67E-10	1.00E-04				0.583	
1,1-Dichloroethene	1.64E+02	1.64E-04				5.99E-04	5.00E-02	5.00E-02	1.20E-02	2.43E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	0.583	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				6.22E-03	1.00E-02	1.00E-01	6.22E-01	2.52E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.583	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				3.00E-04	2.00E-02	2.00E-01	1.50E-02	1.22E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.583	1.0
Methylene chloride	1.93E+02	1.93E-04	6.83E-05	7.50E-03	5.12E-07	1.99E-04	6.00E-02	6.00E-02	3.32E-03	8.08E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	0.583	1.0
Tetrachloroethene	2.93E+03	2.93E-03	1.62E-02	5.40E-01	8.73E-03	4.71E-02	1.00E-02	1.00E-02	4.71E+00	1.91E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	0.583	1.0
Trichloroethene	3.32E+03	3.32E-03	5.16E-03	4.00E-01	2.06E-03	1.51E-02	3.00E-04	3.00E-04	5.02E+01	6.11E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	0.583	1.0
Vinyl Chloride	2.29E+02	2.29E-04	1.14E-04	1.50E+00	1.71E-04	3.32E-04	3.00E-03	3.00E-03	1.11E-01	1.35E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	0.583	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	9.89E-05	1.40E-02	1.39E-06	2.89E-04	2.00E-02	2.00E-02	1.44E-02	1.17E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	0.583	0.8
Total					1.10E-02				5.57E+01							

WORKSHEET 7.4 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Groundwater

Exposure Route: Dermal (Tap)

Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	5.52E-08	1.50E+00	8.28E-08	1.61E-07	3.00E-04	3.00E-04	5.37E-04	1.47E-08	1.00E-03				1	
Lead	8.01E+00	8.01E-06				8.78E-09				8.01E-10	1.00E-04				1	
1,1-Dichloroethene	1.64E+02	1.64E-04				3.59E-05	5.00E-02	5.00E-02	7.18E-04	3.27E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				3.73E-04	1.00E-02	1.00E-01	3.73E-02	3.41E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				1.80E-05	2.00E-02	2.00E-01	9.01E-04	1.64E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	1.93E+02	1.93E-04	4.17E-06	7.50E-03	3.13E-08	1.22E-05	6.00E-02	6.00E-02	2.03E-04	1.11E-06	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	2.93E+03	2.93E-03	9.41E-04	5.40E-01	5.08E-04	2.74E-03	1.00E-02	1.00E-02	2.74E-01	2.50E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	3.32E+03	3.32E-03	3.00E-04	4.00E-01	1.20E-04	8.76E-04	3.00E-04	3.00E-04	2.92E+00	8.00E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl Chloride	2.29E+02	2.29E-04	7.04E-06	1.50E+00	1.06E-05	2.05E-05	3.00E-03	3.00E-03	6.84E-03	1.87E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	5.76E-06	1.40E-02	8.06E-08	1.68E-05	2.00E-02	2.00E-02	8.40E-04	1.53E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					6.39E-04				3.24E+00							

WORKSHEET 7.5 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Groundwater

Exposure Route: Ingestion

Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.47E+01	1.47E-02	8.05E-05	1.50E+00	1.21E-04	9.39E-04	3.00E-04	3.00E-04	3.13E+00
Lead	8.01E+00	8.01E-03							
1,1-Dichloroethene	1.64E+02	1.64E-01				1.05E-02	5.00E-02	5.00E-02	2.10E-01
cis-1,2-Dichloroethene	2.57E+03	2.57E+00				1.65E-01	1.00E-02	1.00E-01	1.65E+01
trans-1,2-Dichloroethene	1.24E+02	1.24E-01				7.94E-03	2.00E-02	2.00E-01	3.97E-01
Methylene chloride	1.93E+02	1.93E-01	1.06E-03	7.50E-03	7.93E-06	1.23E-02	6.00E-02	6.00E-02	2.06E-01
Tetrachloroethene	2.93E+03	2.93E+00	1.61E-02	5.40E-01	8.67E-03	1.87E-01	1.00E-02	1.00E-02	1.87E+01
Trichloroethene	3.32E+03	3.32E+00	1.82E-02	4.00E-01	7.28E-03	2.12E-01	3.00E-04	3.00E-04	7.08E+02
Vinyl Chloride	2.29E+02	2.29E-01	1.26E-03	1.50E+00	1.88E-03	1.47E-02	3.00E-03	3.00E-03	4.88E+00
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-03	3.90E-05	1.40E-02	5.46E-07	4.55E-04	2.00E-02	2.00E-02	2.28E-02
Total					1.80E-02				7.52E+02

WORKSHEET 7.6 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.47E+01	1.47E-02	1.38E-04	1.50E+00	2.07E-04	4.02E-04	3.00E-04	3.00E-04	1.34E+00
Lead	8.01E+00	8.01E-03							
1,1-Dichloroethene	1.64E+02	1.64E-01				4.50E-03	5.00E-02	5.00E-02	9.01E-02
cis-1,2-Dichloroethene	2.57E+03	2.57E+00				7.05E-02	1.00E-02	1.00E-01	7.05E+00
trans-1,2-Dichloroethene	1.24E+02	1.24E-01				3.40E-03	2.00E-02	2.00E-01	1.70E-01
Methylene chloride	1.93E+02	1.93E-01	1.81E-03	7.50E-03	1.36E-05	5.28E-03	6.00E-02	6.00E-02	8.81E-02
Tetrachloroethene	2.93E+03	2.93E+00	2.75E-02	5.40E-01	1.49E-02	8.03E-02	1.00E-02	1.00E-02	8.03E+00
Trichloroethene	3.32E+03	3.32E+00	3.12E-02	4.00E-01	1.25E-02	9.10E-02	3.00E-04	3.00E-04	3.03E+02
Vinyl Chloride	2.29E+02	2.29E-01	2.15E-03	1.50E+00	3.23E-03	6.28E-03	3.00E-03	3.00E-03	2.09E+00
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-03	6.69E-05	1.40E-02	9.36E-07	1.95E-04	2.00E-02	2.00E-02	9.75E-03
Total					3.08E-02				3.22E+02

WORKSHEET 7.7 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Overburden Groundwater

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation (Bath)

Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Henry's Law H' L-water/L-air
Arsenic	1.47E+01			1.50E+01					0	
Lead	8.01E+00								0	
1,1-Dichloroethene	1.64E+02	1.76E+02				3.06E+00	5.70E-02	5.70E-02	5.36E+01	1.07E+00
cis-1,2-Dichloroethene	2.57E+03	4.30E+02				7.47E+00	1.00E-01	1.00E-01	7.47E+01	1.67E-01
trans-1,2-Dichloroethene	1.24E+02	4.78E+01				8.31E-01	2.00E-03	2.00E-03	4.16E+02	3.85E-01
Methylene chloride	1.93E+02	1.73E+01	2.58E-02	1.60E-03	4.13E-05	3.01E-01	8.60E-01	8.60E-01	3.50E-01	8.98E-02
Tetrachloroethene	2.93E+03	2.21E+03	3.29E+00	2.10E-02	6.91E-02	3.84E+01	1.00E-02	1.00E-02	3.84E+03	7.54E-01
Trichloroethene	3.32E+03	1.40E+03	2.09E+00	4.00E-01	8.35E-01	2.44E+01	1.00E-02	1.00E-02	2.44E+03	4.22E-01
Vinyl Chloride	2.29E+02	2.54E+02	3.79E-01	3.10E-02	1.18E-02	4.42E+00	2.90E-02	2.90E-02	1.52E+02	1.11E+00
Bis(2-ethylhexyl)phthalate	7.12E+00	2.98E-05								4.18E-06
Total					9.16E-01				6.97E+03	

WORKSHEET 7.8 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Scenario Timeframe: Current/Future

Medium: Groundwater

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation (Shower)

Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Henry's Law H' L-water/L-air
Arsenic	1.47E+01			1.50E+01					0	
Lead	8.01E+00								0	
1,1-Dichloroethene	1.64E+02	1.76E+02				7.72E-01	5.70E-02	5.70E-02	13.55156043	1.07
cis-1,2-Dichloroethene	2.57E+03	4.30E+02				1.89E+00	1.00E-01	1.00E-01	18.87875239	0.167
trans-1,2-Dichloroethene	1.24E+02	4.78E+01				2.10E-01	2.00E-03	2.00E-03	105.0701213	0.385
Methylene chloride	1.93E+02	1.73E+01	2.61E-02	1.60E-03	4.17E-05	7.61E-02	8.60E-01	8.60E-01	0.088467395	0.0898
Tetrachloroethene	2.93E+03	2.21E+03	3.33E+00	2.10E-02	6.98E-02	9.70E+00	1.00E-02	1.00E-02	970.1194134	0.754
Trichloroethene	3.32E+03	1.40E+03	2.11E+00	4.00E-01	8.45E-01	6.16E+00	1.00E-02	1.00E-02	615.8661479	0.422
Vinyl Chloride	2.29E+02	2.54E+02	3.83E-01	3.10E-02	1.19E-02	1.12E+00	2.90E-02	2.90E-02	38.53805394	1.11
Bis(2-ethylhexyl)phthalate	7.12E+00	2.98E-05								4.18E-06
Total					9.26E-01				1.76E+03	

WORKSHEET 7.9 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	halation Canc Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Volatization Factor VF (mg/m3-air)/ (mg/L-water)
Arsenic	1.91E+01			1.50E+01					0	
Lead	1.07E+01								0	
1,1-Dichloroethene	2.20E+02	1.52E-04				1.97E-05	5.70E-02	5.70E-02	3.45E-04	6.91E-04
cis-1,2-Dichloroethene	3.70E+03	1.61E-03				2.08E-04	1.00E-01	1.00E-01	2.08E-03	4.36E-04
trans-1,2-Dichloroethene	1.54E+02	7.32E-05				9.44E-06	2.00E-03	2.00E-03	4.72E-03	4.75E-04
Methylene chloride	2.63E+02	1.10E-04	1.22E-06	1.60E-03	1.95E-09	1.42E-05	8.60E-01	8.60E-01	1.65E-05	4.19E-04
Tetrachloroethene	4.19E+03	2.35E-03	2.60E-05	2.10E-02	5.45E-07	3.03E-04	1.00E-02	1.00E-02	3.03E-02	5.60E-04
Trichloroethene	3.74E+03	1.85E-03	2.04E-05	4.00E-01	8.18E-06	2.39E-04	1.00E-02	1.00E-02	2.39E-02	4.94E-04
Vinyl Chloride	2.75E+02	2.08E-04	2.30E-06	3.10E-02	7.14E-08	2.69E-05	2.90E-02	2.90E-02	9.26E-04	7.58E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0	3.57E-04
Total					8.80E-06				6.22E-02	

WORKSHEET 7.10 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	halation Canc Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Volatization Factor VF (mg/m3-air)/ (mg/L-water)
Arsenic	1.91E+01			1.50E+01					0	
Lead	1.07E+01								0	
1,1-Dichloroethene	2.20E+02	1.52E-04				3.47E-06	5.70E-02	5.70E-02	6.10E-05	6.91E-04
cis-1,2-Dichloroethene	3.70E+03	1.61E-03				3.68E-05	1.00E-01	1.00E-01	3.68E-04	4.36E-04
trans-1,2-Dichloroethene	1.54E+02	7.32E-05				1.67E-06	2.00E-03	2.00E-03	8.35E-04	4.75E-04
Methylene chloride	2.63E+02	1.10E-04	8.60E-07	1.60E-03	1.38E-09	2.51E-06	8.60E-01	8.60E-01	2.92E-06	4.19E-04
Tetrachloroethene	4.19E+03	2.35E-03	1.84E-05	2.10E-02	3.86E-07	5.36E-05	1.00E-02	1.00E-02	5.36E-03	5.60E-04
Trichloroethene	3.74E+03	1.85E-03	1.45E-05	4.00E-01	5.78E-06	4.22E-05	1.00E-02	1.00E-02	4.22E-03	4.94E-04
Vinyl Chloride	2.75E+02	2.08E-04	1.63E-06	3.10E-02	5.05E-08	4.75E-06	2.90E-02	2.90E-02	1.64E-04	7.58E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0	3.57E-04
Total					6.22E-06				1.10E-02	

WORKSHEET 7.11 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal
Receptor: Com. & Ind. Worker

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	4.11E-08	1.50E+00	6.16E-08	1.15E-07	3.00E-04	3.00E-04	3.83E-04	1.47E-08	1.00E-03				1	
Lead	8.01E+00	8.01E-06				6.27E-09				8.01E-10	1.00E-04				1	
1,1-Dichloroethene	1.64E+02	1.64E-04				2.56E-05	5.00E-02		5.13E-04	3.27E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				2.67E-04	1.00E-02	5.00E-02	2.67E-02	3.41E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				1.29E-05	2.00E-02	1.00E-01	6.44E-04	1.64E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	1.93E+02	1.93E-04	3.10E-06	7.50E-03	2.33E-08	8.69E-06	6.00E-02	2.00E-01	1.45E-04	1.11E-06	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	2.93E+03	2.93E-03	7.00E-04	5.40E-01	3.78E-04	1.96E-03	1.00E-02	6.00E-02	1.96E-01	2.50E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	3.32E+03	3.32E-03	2.24E-04	4.00E-01	8.94E-05	6.26E-04	3.00E-04	1.00E-02	2.09E+00	8.00E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl chloride	2.29E+02	2.29E-04	5.24E-06	7.20E-01	3.77E-06	1.47E-05	3.00E-03	3.00E-03	4.89E-03	1.87E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	4.29E-06	1.40E-02	6.00E-08	1.20E-05	2.00E-02	2.00E-02	6.00E-04	1.53E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					4.71E-04				2.32E+00							

WORKSHEET 7.12 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.47E+01	1.47E-02	5.13E-05	1.50E+00	7.70E-05	1.44E-04	3.00E-04	3.00E-04	4.79E-01
Lead	8.01E+00	8.01E-03							
1,1-Dichloroethene	1.64E+02	1.64E-01				1.61E-03	5.00E-02	5.00E-02	3.22E-02
cis-1,2-Dichloroethene	2.57E+03	2.57E+00				2.52E-02	1.00E-02	1.00E-01	2.52E+00
trans-1,2-Dichloroethene	1.24E+02	1.24E-01				1.22E-03	2.00E-02	2.00E-01	6.08E-02
Methylene chloride	1.93E+02	1.93E-01	6.74E-04	7.50E-03	5.06E-06	1.89E-03	6.00E-02	6.00E-02	3.15E-02
Tetrachloroethene	2.93E+03	2.93E+00	1.02E-02	5.40E-01	5.53E-03	2.87E-02	1.00E-02	1.00E-02	2.87E+00
Trichloroethene	3.32E+03	3.32E+00	1.16E-02	4.00E-01	4.64E-03	3.25E-02	3.00E-04	3.00E-04	1.08E+02
Vinyl chloride	2.29E+02	2.29E-01	8.01E-04	7.20E-01	5.77E-04	2.24E-03	3.00E-03	3.00E-03	7.48E-01
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-03	2.49E-05	1.40E-02	3.48E-07	6.97E-05	2.00E-02	2.00E-02	3.48E-03
Total					1.08E-02				1.15E+02

WORKSHEET 7.13 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	hhalation Canc Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Volatization Factor VF (mg/m3-air)/ (mg/L-water)
Arsenic	1.91E+01			1.50E+01					0	
Lead	1.07E+01								0	
1,1-Dichloroethene	2.20E+02	1.52E-04				1.86E-06	5.70E-02	5.70E-02	3.27E-05	6.91E-04
cis-1,2-Dichloroethene	3.70E+03	1.61E-03				1.97E-05	1.00E-01	1.00E-01	1.97E-04	4.36E-04
trans-1,2-Dichloroethene	1.54E+02	7.32E-05				8.95E-07	2.00E-03	2.00E-03	4.47E-04	4.75E-04
Methylene chloride	2.63E+02	1.10E-04	4.80E-07	1.60E-03	7.68E-10	1.34E-06	8.60E-01	8.60E-01	1.56E-06	4.19E-04
Tetrachloroethene	4.19E+03	2.35E-03	1.02E-05	2.10E-02	2.15E-07	2.87E-05	1.00E-02	1.00E-02	2.87E-03	5.60E-04
Trichloroethene	3.74E+03	1.85E-03	8.07E-06	4.00E-01	3.23E-06	2.26E-05	1.00E-02	1.00E-02	2.26E-03	4.94E-04
Vinyl Chloride	2.75E+02	2.08E-04	9.09E-07	1.50E-02	1.36E-08	2.54E-06	2.90E-02	2.90E-02	8.77E-05	7.58E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0	3.57E-04
Total					3.46E-06				5.90E-03	

WORKSHEET 7.14 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal
Receptor: Construction Worker

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	6.10E-09	1.50E+00	9.15E-09	4.27E-07	3.00E-04	3.00E-04	1.42E-03	1.47E-08	1.00E-03				1	1.0
Lead	8.01E+00	8.01E-06				2.33E-08				8.01E-10	1.00E-04				1	1.0
1,1-Dichloroethene	1.64E+02	1.64E-04				9.52E-05	5.00E-02	5.00E-02	1.90E-03	3.27E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				9.90E-04	1.00E-02	1.00E-01	9.90E-03	3.41E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				4.78E-05	2.00E-02	2.00E-01	2.39E-04	1.64E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	1.93E+02	1.93E-04	4.61E-07	7.50E-03	3.46E-09	3.22E-05	6.00E-02	6.00E-02	5.37E-04	1.11E-06	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	2.93E+03	2.93E-03	1.04E-04	5.40E-01	5.61E-05	7.28E-03	1.00E-02	1.00E-02	7.28E-01	2.50E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	3.32E+03	3.32E-03	3.32E-05	4.00E-01	1.33E-05	2.32E-03	3.00E-04	3.00E-04	7.75E+00	8.00E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl chloride	2.29E+02	2.29E-04	7.78E-07	7.20E-01	5.60E-07	5.44E-05	3.00E-03	3.00E-03	1.81E-02	1.87E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	6.36E-07	1.40E-02	8.91E-09	4.45E-05	2.00E-02	2.00E-02	2.23E-03	1.53E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					7.00E-05				8.51E+00							

WORKSHEET 7.15 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Construction Worker

Chemical Constituents of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless
Arsenic	1.47E+01			1.50E+01					0
Lead	8.01E+00								0
1,1-Dichloroethene	1.64E+02	1.14E-04				1.50E-05	5.70E-02	5.70E-02	2.63E-04
cis-1,2-Dichloroethene	2.57E+03	1.12E-03				1.48E-04	1.00E-01	1.00E-01	1.48E-03
trans-1,2-Dichloroethene	1.24E+02	5.90E-05				7.79E-06	2.00E-03	2.00E-03	3.90E-03
Methylene chloride	1.93E+02	8.07E-05	1.52E-07	1.60E-03	2.44E-10	1.07E-05	8.60E-01	8.60E-01	1.24E-05
Tetrachloroethene	2.93E+03	1.64E-03	3.09E-06	2.10E-02	6.50E-08	2.17E-04	1.00E-02	1.00E-02	2.17E-02
Trichloroethene	3.32E+03	1.64E-03	3.10E-06	4.00E-01	1.24E-06	2.17E-04	1.00E-02	1.00E-02	2.17E-02
Vinyl chloride	2.29E+02	1.74E-04	3.28E-07	1.50E-02	4.92E-09	2.29E-05	2.90E-02	2.90E-02	7.91E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0
Total					1.31E-06				4.98E-02

WORKSHEET 7.16 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Child

Chemical Constituents of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless
Arsenic	1.47E+01			1.50E+01					0
Lead	8.01E+00								0
1,1-Dichloroethene	1.64E+02	1.14E-04				1.22E-06	5.70E-02	5.70E-02	2.13E-05
cis-1,2-Dichloroethene	2.57E+03	1.12E-03				1.20E-05	1.00E-01	1.00E-01	1.20E-04
trans-1,2-Dichloroethene	1.24E+02	5.90E-05				6.32E-07	2.00E-03	2.00E-03	3.16E-04
Methylene chloride	1.93E+02	8.07E-05	7.41E-08	1.60E-03	1.19E-10	8.65E-07	8.60E-01	8.60E-01	1.01E-06
Tetrachloroethene	2.93E+03	1.64E-03	1.51E-06	2.10E-02	3.16E-08	1.76E-05	1.00E-02	1.00E-02	1.76E-03
Trichloroethene	3.32E+03	1.64E-03	1.51E-06	4.00E-01	6.03E-07	1.76E-05	1.00E-02	1.00E-02	1.76E-03
Vinyl chloride	2.29E+02	1.74E-04	1.60E-07	3.10E-02	4.95E-09	1.86E-06	2.90E-02	2.90E-02	6.42E-05
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0
Total					6.40E-07				4.04E-03

WORKSHEET 7.17 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Adult

Chemical Constituents of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless
Arsenic	1.47E+01			1.50E+01					0
Lead	8.01E+00								0
1,1-Dichloroethene	1.64E+02	1.14E-04				1.00E-06	5.70E-02	5.70E-02	1.75E-05
cis-1,2-Dichloroethene	2.57E+03	1.12E-03				9.89E-06	1.00E-01	1.00E-01	9.89E-05
trans-1,2-Dichloroethene	1.24E+02	5.90E-05				5.19E-07	2.00E-03	2.00E-03	2.60E-04
Methylene chloride	1.93E+02	8.07E-05	2.44E-07	1.60E-03	3.90E-10	7.11E-07	8.60E-01	8.60E-01	8.27E-07
Tetrachloroethene	2.93E+03	1.64E-03	4.95E-06	2.10E-02	1.04E-07	1.44E-05	1.00E-02	1.00E-02	1.44E-03
Trichloroethene	3.32E+03	1.64E-03	4.96E-06	4.00E-01	1.98E-06	1.45E-05	1.00E-02	1.00E-02	1.45E-03
Vinyl chloride	2.29E+02	1.74E-04	5.24E-07	3.10E-02	1.63E-08	1.53E-06	2.90E-02	2.90E-02	5.27E-05
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0
Total					2.10E-06				3.32E-03

WORKSHEET 7.18 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Visistor/Tresspasser

Chemical Constituents of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless
Arsenic	1.47E+01			1.50E+01					0
Lead	8.01E+00								0
1,1-Dichloroethene	1.64E+02	1.14E-04				1.78E-07	5.70E-02	5.70E-02	3.12E-06
cis-1,2-Dichloroethene	2.57E+03	1.12E-03				1.76E-06	1.00E-01	1.00E-01	1.76E-05
trans-1,2-Dichloroethene	1.24E+02	5.90E-05				9.23E-08	2.00E-03	2.00E-03	4.62E-05
Methylene chloride	1.93E+02	8.07E-05	4.33E-08	1.60E-03	6.93E-11	1.26E-07	8.60E-01	8.60E-01	1.47E-07
Tetrachloroethene	2.93E+03	1.64E-03	8.80E-07	2.10E-02	1.85E-08	2.57E-06	1.00E-02	1.00E-02	2.57E-04
Trichloroethene	3.32E+03	1.64E-03	8.81E-07	4.00E-01	3.52E-07	2.57E-06	1.00E-02	1.00E-02	2.57E-04
Vinyl chloride	2.29E+02	1.74E-04	9.32E-08	3.10E-02	2.89E-09	2.72E-07	2.90E-02	2.90E-02	9.37E-06
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0
Total					3.74E-07				5.90E-04

WORKSHEET 7.19 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 1
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Agricultural Worker

Chemical Constituents of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless
Arsenic	1.47E+01			1.50E+01					0
Lead	8.01E+00								0
1,1-Dichloroethene	1.64E+02	1.14E-04				1.50E-05	5.70E-02	5.70E-02	2.63E-04
cis-1,2-Dichloroethene	2.57E+03	1.12E-03				1.48E-04	1.00E-01	1.00E-01	1.48E-03
trans-1,2-Dichloroethene	1.24E+02	5.90E-05				7.79E-06	2.00E-03	2.00E-03	3.90E-03
Methylene chloride	1.93E+02	8.07E-05	4.57E-06	1.60E-03	7.31E-09	1.07E-05	8.60E-01	8.60E-01	1.24E-05
Tetrachloroethene	2.93E+03	1.64E-03	9.28E-05	2.10E-02	1.95E-06	2.17E-04	1.00E-02	1.00E-02	2.17E-02
Trichloroethene	3.32E+03	1.64E-03	9.30E-05	4.00E-01	3.72E-05	2.17E-04	1.00E-02	1.00E-02	2.17E-02
Vinyl chloride	2.29E+02	1.74E-04	9.83E-06	1.50E-02	1.47E-07	2.29E-05	2.90E-02	2.90E-02	7.91E-04
Bis(2-ethylhexyl)phthalate	7.12E+00	2.54E-06							0
Total					3.93E-05				4.98E-02

WORKSHEET 7.20 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal (Bath)
Receptor: Resident Child

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.60E+01	1.60E-05	4.33E-07	1.50E+00	6.49E-07	5.05E-06	3.00E-04	3.00E-04	1.68E-02	1.20E-08	1.00E-03				0.75	
Lead	0.00E+00					0.00E+00					1.00E-04				0.75	
1,1-Dichloroethene	9.67E+01	9.67E-05				6.84E-04	5.00E-02	5.00E-02	1.37E-02	1.62E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	0.75	1.0
cis-1,2-Dichloroethene	1.21E+03	1.21E-03				5.65E-03	1.00E-02	1.00E-01	5.65E-01	1.34E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.75	1.0
trans-1,2-Dichloroethene	6.78E+01	6.78E-05				3.18E-04	2.00E-02	2.00E-01	1.59E-02	7.53E-07	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.75	1.0
Methylene chloride	6.72E+01	6.72E-05	1.15E-05	7.50E-03	8.66E-08	1.35E-04	6.00E-02	6.00E-02	2.24E-03	3.19E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	0.75	1.0
Tetrachloroethene	1.04E+03	1.04E-03	2.77E-03	5.40E-01	1.50E-03	3.23E-02	1.00E-02	1.00E-02	3.23E+00	7.67E-05	3.28E-02	8.91E-01	2.14E+00	1.62E-01	0.75	1.0
Trichloroethene	2.48E+03	2.48E-03	1.87E-03	4.00E-01	7.47E-04	2.18E-02	3.00E-04	3.00E-04	7.26E+01	5.16E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	0.75	1.0
Vinyl Chloride	1.20E+02	1.20E-04	2.96E-05	1.50E+00	4.44E-05	3.45E-04	3.00E-03	3.00E-03	1.15E-01	8.18E-07	5.59E-03	2.35E-01	5.64E-01	1.70E-02	0.75	1.0
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02		0.00E+00	2.00E-02	2.00E-02	0.00E+00		2.42E-02	1.62E+01	3.90E+01	1.84E-01	0.75	0.8
Total					2.29E-03				7.65E+01							

WORKSHEET 7.21 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal (Tap)
Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.60E+01	1.60E-05	3.15E-08	1.50E+00	4.72E-08	3.67E-07	3.00E-04	3.00E-04	1.22E-03	1.60E-08	1.00E-03				1	
Lead	0.00E+00					0.00E+00					1.00E-04				1	
1,1-Dichloroethene	9.67E+01	9.67E-05				4.43E-05	5.00E-02	5.00E-02	8.87E-04	1.93E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	1.21E+03	1.21E-03				3.67E-04	1.00E-02	1.00E-01	3.67E-02	1.60E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	6.78E+01	6.78E-05				2.06E-05	2.00E-02	2.00E-01	1.03E-03	8.97E-07	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	6.72E+01	6.72E-05	7.62E-07	7.50E-03	5.72E-09	8.89E-06	6.00E-02	6.00E-02	1.48E-04	3.86E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	1.04E+03	1.04E-03	1.75E-04	5.40E-01	9.43E-05	2.04E-03	1.00E-02	1.00E-02	2.04E-01	8.85E-05	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	2.48E+03	2.48E-03	1.18E-04	4.00E-01	4.70E-05	1.37E-03	3.00E-04	3.00E-04	4.57E+00	5.96E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl Chloride	1.20E+02	1.20E-04	1.94E-06	1.50E+00	2.91E-06	2.26E-05	3.00E-03	3.00E-03	7.55E-03	9.84E-07	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02		0.00E+00	2.00E-02	2.00E-02	0.00E+00		2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					1.44E-04				4.82E+00							

WORKSHEET 7.22 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal (Shower)
Receptor: Resident Adult

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.60E+01	1.60E-05	7.87E-07	1.50E+00	1.18E-06	2.29E-06	3.00E-04	3.00E-04	7.65E-03	9.31E-09	1.00E-03				0.583	
Lead	0.00E+00					0.00E+00					1.00E-04				0.583	
1,1-Dichloroethene	9.67E+01	9.67E-05				3.52E-04	5.00E-02	5.00E-02	7.05E-03	1.43E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	0.583	1.0
cis-1,2-Dichloroethene	1.21E+03	1.21E-03				2.91E-03	1.00E-02	1.00E-01	2.91E-01	1.18E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.583	1.0
trans-1,2-Dichloroethene	6.78E+01	6.78E-05				1.64E-04	2.00E-02	2.00E-01	8.18E-03	6.64E-07	7.67E-03	3.66E-01	8.80E-01	2.90E-02	0.583	1.0
Methylene chloride	6.72E+01	6.72E-05	2.38E-05	7.50E-03	1.78E-07	6.94E-05	6.00E-02	6.00E-02	1.16E-03	2.81E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	0.583	1.0
Tetrachloroethene	1.04E+03	1.04E-03	5.71E-03	5.40E-01	3.09E-03	1.67E-02	1.00E-02	1.00E-02	1.67E+00	6.76E-05	3.28E-02	8.91E-01	2.14E+00	1.62E-01	0.583	1.0
Trichloroethene	2.48E+03	2.48E-03	3.85E-03	4.00E-01	1.54E-03	1.12E-02	3.00E-04	3.00E-04	3.74E+01	4.55E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	0.583	1.0
Vinyl Chloride	1.20E+02	1.20E-04	5.98E-05	1.50E+00	8.97E-05	1.74E-04	3.00E-03	3.00E-03	5.82E-02	7.08E-07	5.59E-03	2.35E-01	5.64E-01	1.70E-02	0.583	1.0
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02		0.00E+00	2.00E-02	2.00E-02	0.00E+00		2.42E-02	1.62E+01	3.90E+01	1.84E-01	0.583	0.8
Total					4.71E-03				3.94E+01							

WORKSHEET 7.23 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal (Tap)
Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.60E+01	1.60E-05	6.00E-08	1.50E+00	9.00E-08	1.75E-07	3.00E-04	3.00E-04	5.83E-04	1.60E-08	1.00E-03				1	
Lead	0.00E+00					0.00E+00					1.00E-04				1	
1,1-Dichloroethene	9.67E+01	9.67E-05				2.11E-05	5.00E-02	5.00E-02	4.22E-04	1.93E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	1.21E+03	1.21E-03				1.75E-04	1.00E-02	1.00E-01	1.75E-02	1.60E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	6.78E+01	6.78E-05				9.83E-06	2.00E-02	2.00E-01	4.91E-04	8.97E-07	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	6.72E+01	6.72E-05	1.45E-06	7.50E-03	1.09E-08	4.23E-06	6.00E-02	6.00E-02	7.06E-05	3.86E-07	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	1.04E+03	1.04E-03	3.33E-04	5.40E-01	1.80E-04	9.70E-04	1.00E-02	1.00E-02	9.70E-02	8.85E-05	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	2.48E+03	2.48E-03	2.24E-04	4.00E-01	8.96E-05	6.53E-04	3.00E-04	3.00E-04	2.18E+00	5.96E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl Chloride	1.20E+02	1.20E-04	3.70E-06	1.50E+00	5.54E-06	1.08E-05	3.00E-03	3.00E-03	3.59E-03	9.84E-07	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02		0.00E+00	2.00E-02	2.00E-02	0.00E+00		2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					2.75E-04				2.30E+00							

WORKSHEET 7.24 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.60E+01	1.60E-02	8.75E-05	1.50E+00	1.31E-04	1.02E-03	3.00E-04	3.00E-04	3.40E+00
Lead	0.00E+00								
1,1-Dichloroethene	9.67E+01	9.67E-02				6.18E-03	5.00E-02	5.00E-02	1.24E-01
cis-1,2-Dichloroethene	1.21E+03	1.21E+00				7.71E-02	1.00E-02	1.00E-01	7.71E+00
trans-1,2-Dichloroethene	6.78E+01	6.78E-02				4.33E-03	2.00E-02	2.00E-01	2.17E-01
Methylene chloride	6.72E+01	6.72E-02	3.68E-04	7.50E-03	2.76E-06	4.29E-03	6.00E-02	6.00E-02	7.16E-02
Tetrachloroethene	1.04E+03	1.04E+00	5.67E-03	5.40E-01	3.06E-03	6.62E-02	1.00E-02	1.00E-02	6.62E+00
Trichloroethene	2.48E+03	2.48E+00	1.36E-02	4.00E-01	5.43E-03	1.58E-01	3.00E-04	3.00E-04	5.28E+02
Vinyl Chloride	1.20E+02	1.20E-01	6.59E-04	1.50E+00	9.89E-04	7.69E-03	3.00E-03	3.00E-03	2.56E+00
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02			2.00E-02	2.00E-02	0.00E+00
Total					9.61E-03				5.48E+02

WORKSHEET 7.25 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.60E+01	1.60E-02	1.50E-04	1.50E+00	2.25E-04	4.37E-04	3.00E-04	3.00E-04	1.46E+00
Lead	0.00E+00								
1,1-Dichloroethene	9.67E+01	9.67E-02				2.65E-03	5.00E-02	5.00E-02	5.30E-02
cis-1,2-Dichloroethene	1.21E+03	1.21E+00				3.30E-02	1.00E-02	1.00E-01	3.30E+00
trans-1,2-Dichloroethene	6.78E+01	6.78E-02				1.86E-03	2.00E-02	2.00E-01	9.28E-02
Methylene chloride	6.72E+01	6.72E-02	6.31E-04	7.50E-03	4.73E-06	1.84E-03	6.00E-02	6.00E-02	3.07E-02
Tetrachloroethene	1.04E+03	1.04E+00	9.73E-03	5.40E-01	5.25E-03	2.84E-02	1.00E-02	1.00E-02	2.84E+00
Trichloroethene	2.48E+03	2.48E+00	2.33E-02	4.00E-01	9.30E-03	6.78E-02	3.00E-04	3.00E-04	2.26E+02
Vinyl Chloride	1.20E+02	1.20E-01	1.13E-03	1.50E+00	1.70E-03	3.30E-03	3.00E-03	3.00E-03	1.10E+00
Bis(2-ethylhexyl)phthalate	0.00E+00			1.40E-02			2.00E-02	2.00E-02	0.00E+00
Total					1.65E-02				2.35E+02

WORKSHEET 7.26 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Indoor Air - Vapors
Exposure Route: Inhalation (Bath)
Receptor: Resident Child

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Henry's Law H' L-water/L-air
Arsenic	1.60E+01			1.50E+01					0	
Lead	0.00E+00								0	
1,1-Dichloroethene	9.67E+01	1.03E+02				1.80E+00	5.70E-02	5.70E-02	3.16E+01	1.07E+00
cis-1,2-Dichloroethene	1.21E+03	2.01E+02				3.50E+00	1.00E-01	1.00E-01	3.50E+01	1.67E-01
trans-1,2-Dichloroethene	6.78E+01	2.61E+01				4.53E-01	2.00E-03	2.00E-03	2.27E+02	3.85E-01
Methylene chloride	6.72E+01	6.03E+00	8.99E-03	1.60E-03	1.44E-05	1.05E-01	8.60E-01	8.60E-01	1.22E-01	8.98E-02
Tetrachloroethene	1.04E+03	7.81E+02	1.16E+00	2.10E-02	2.44E-02	1.36E+01	1.00E-02	1.00E-02	1.36E+03	7.54E-01
Trichloroethene	2.48E+03	1.04E+03	1.56E+00	4.00E-01	6.23E-01	1.82E+01	1.00E-02	1.00E-02	1.82E+03	4.22E-01
Vinyl Chloride	1.20E+02	1.34E+02	1.99E-01	3.10E-02	6.17E-03	2.32E+00	2.90E-02	2.90E-02	8.01E+01	1.11E+00
Bis(2-ethylhexyl)phthalate	0.00E+00	0.00E+00								4.18E-06
Total					6.53E-01				3.55E+03	

WORKSHEET 7.27 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Bedrock Groundwater
Exposure Medium: Indoor Air - Vapors
Exposure Route: Inhalation (Shower)
Receptor: Resident Adult

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) unitless	Henry's Law H' L-water/L-air
Arsenic	1.60E+01			1.50E+01					0	
Lead	0.00E+00								0	
1,1-Dichloroethene	9.67E+01	1.03E+02				4.55E-01	5.70E-02	5.70E-02	7.974472014	1.07E+00
cis-1,2-Dichloroethene	1.21E+03	2.01E+02				8.85E-01	1.00E-01	1.00E-01	8.845749578	1.67E-01
trans-1,2-Dichloroethene	6.78E+01	2.61E+01				1.15E-01	2.00E-03	2.00E-03	57.29060782	3.85E-01
Methylene chloride	6.72E+01	6.03E+00	9.08E-03	1.60E-03	1.45E-05	2.65E-02	8.60E-01	8.60E-01	0.03080833	8.98E-02
Tetrachloroethene	1.04E+03	7.81E+02	1.18E+00	2.10E-02	2.47E-02	3.43E+00	1.00E-02	1.00E-02	342.9154642	7.54E-01
Trichloroethene	2.48E+03	1.04E+03	1.57E+00	4.00E-01	6.29E-01	4.59E+00	1.00E-02	1.00E-02	458.9847818	4.22E-01
Vinyl Chloride	1.20E+02	1.34E+02	2.01E-01	3.10E-02	6.24E-03	5.87E-01	2.90E-02	2.90E-02	20.23328542	1.11E+00
Bis(2-ethylhexyl)phthalate	0.00E+00	0.00E+00								4.18E-06
Total					6.60E-01				8.96E+02	

WORKSHEET 7.28 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Dermal
Receptor: Com. & Ind. Worker

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	1.47E+01	1.47E-05	4.11E-08	1.50E+00	6.16E-08	1.15E-07	3.00E-04	3.00E-04	3.83E-04	1.47E-08	1.00E-03				1	
Lead	8.01E+00	8.01E-06				6.27E-09				8.01E-10	1.00E-04				1	
1,1-Dichloroethene	1.64E+02	1.64E-04				2.56E-05	5.00E-02		5.13E-04	3.27E-06	1.16E-02	3.66E-01	8.79E-01	4.38E-02	1	1.0
cis-1,2-Dichloroethene	2.57E+03	2.57E-03				2.67E-04	1.00E-02	5.00E-02	2.67E-02	3.41E-05	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
trans-1,2-Dichloroethene	1.24E+02	1.24E-04				1.29E-05	2.00E-02	1.00E-01	6.44E-04	1.64E-06	7.67E-03	3.66E-01	8.80E-01	2.90E-02	1	1.0
Methylene chloride	1.93E+02	1.93E-04	3.10E-06	7.50E-03	2.33E-08	8.69E-06	6.00E-02	2.00E-01	1.45E-04	1.11E-06	3.54E-03	3.14E-01	7.53E-01	1.26E-02	1	1.0
Tetrachloroethene	2.93E+03	2.93E-03	7.00E-04	5.40E-01	3.78E-04	1.96E-03	1.00E-02	6.00E-02	1.96E-01	2.50E-04	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1.0
Trichloroethene	3.32E+03	3.32E-03	2.24E-04	4.00E-01	8.94E-05	6.26E-04	3.00E-04	1.00E-02	2.09E+00	8.00E-05	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1.0
Vinyl chloride	2.29E+02	2.29E-04	5.24E-06	7.20E-01	3.77E-06	1.47E-05	3.00E-03	3.00E-03	4.89E-03	1.87E-06	5.59E-03	2.35E-01	5.64E-01	1.70E-02	1	1.0
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-06	4.29E-06	1.40E-02	6.00E-08	1.20E-05	2.00E-02	2.00E-02	6.00E-04	1.53E-06	2.42E-02	1.62E+01	3.90E+01	1.84E-01	1	0.8
Total					4.71E-04				2.32E+00							

WORKSHEET 7.29 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 2
Scenario Timeframe: Current/Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Groundwater Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	1.47E+01	1.47E-02	5.13E-05	1.50E+00	7.70E-05	1.44E-04	3.00E-04	3.00E-04	4.79E-01
Lead	8.01E+00	8.01E-03							
1,1-Dichloroethene	1.64E+02	1.64E-01				1.61E-03	5.00E-02	5.00E-02	3.22E-02
cis-1,2-Dichloroethene	2.57E+03	2.57E+00				2.52E-02	1.00E-02	1.00E-01	2.52E+00
trans-1,2-Dichloroethene	1.24E+02	1.24E-01				1.22E-03	2.00E-02	2.00E-01	6.08E-02
Methylene chloride	1.93E+02	1.93E-01	6.74E-04	7.50E-03	5.06E-06	1.89E-03	6.00E-02	6.00E-02	3.15E-02
Tetrachloroethene	2.93E+03	2.93E+00	1.02E-02	5.40E-01	5.53E-03	2.87E-02	1.00E-02	1.00E-02	2.87E+00
Trichloroethene	3.32E+03	3.32E+00	1.16E-02	4.00E-01	4.64E-03	3.25E-02	3.00E-04	3.00E-04	1.08E+02
Vinyl chloride	2.29E+02	2.29E-01	8.01E-04	7.20E-01	5.77E-04	2.24E-03	3.00E-03	3.00E-03	7.48E-01
Bis(2-ethylhexyl)phthalate	7.12E+00	7.12E-03	2.49E-05	1.40E-02	3.48E-07	6.97E-05	2.00E-02	2.00E-02	3.48E-03
Total					1.08E-02				1.15E+02

WORKSHEET 7.30 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Dermal
Receptor: Resident and Recreational Child

Chemical Constituent of Potential Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	6.28E+00	6.28E-06	2.34E-08	1.50E+00	3.51E-08	2.73E-07	3.00E-04	3.00E-04	9.09E-04	1.89E-08	1.00E-03				3	1
Lead	5.75E+01	5.75E-05								1.73E-08	1.00E-04				3	1
Vanadium	2.15E+01	2.15E-05				9.33E-07	2.60E-05	2.60E-05	3.59E-02	6.45E-08	1.00E-03				3	1
Tetrachloroethene	2.52E+00	2.52E-06	4.76E-07	5.40E-01	2.57E-07	4.76E-07	1.00E-02	6.00E-02	4.76E-05	3.84E-07	3.28E-02	8.91E-01	2.14E+00	1.62E-01	3	1
Trichloroethene	2.52E+00	2.52E-06	1.46E-07	4.00E-01	5.84E-08	1.46E-07	3.00E-04	1.00E-02	4.87E-04	1.18E-07	1.15E-02	5.72E-01	1.37E+00	5.08E-02	3	1
Total					3.51E-07				3.73E-02							

WORKSHEET 7.31 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Dermal
Receptor: Resident, Recreational, Visitor/Trespasser Adult

Chemical Constituent of Potential Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	6.28E+00	6.28E-06	5.46E-08	1.50E+00	8.20E-08	1.59E-07	3.00E-04	3.00E-04	5.31E-04	1.89E-08	1.00E-03				3	1
Lead	5.75E+01	5.75E-05								1.73E-08	1.00E-04				3	1
Vanadium	2.15E+01	2.15E-05				5.45E-07	2.60E-05	2.60E-05	2.10E-02	6.45E-08	1.00E-03				3	1
Tetrachloroethene	2.52E+00	2.52E-06	1.11E-06	5.40E-01	6.01E-07	0.00E+00	1.00E-02	6.00E-02	0.00E+00	3.84E-07	3.28E-02	8.91E-01	2.14E+00	1.62E-01	3	1
Trichloroethene	2.52E+00	2.52E-06	3.41E-07	4.00E-01	1.37E-07	0.00E+00	3.00E-04	1.00E-02	0.00E+00	1.18E-07	1.15E-02	5.72E-01	1.37E+00	5.08E-02	3	1
Total					8.19E-07				2.15E-02							

WORKSHEET 7.32 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Ingestion
Receptor: Resident and Recreational Child

Chemical Constituent of Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	6.28E+00	6.28E-03	1.77E-07	1.50E+00	2.66E-07	2.07E-06	3.00E-04	3.00E-04	6.89E-03
Lead	5.75E+01	5.75E-02							
Vanadium	2.15E+01	2.15E-02				7.06E-06	1.00E-03	1.00E-03	7.06E-03
Tetrachloroethene	2.52E+00	2.52E-03	7.11E-08	5.40E-01	3.84E-08	7.11E-08	1.00E-02	1.00E-02	7.11E-06
Trichloroethene	2.52E+00	2.52E-03	7.11E-08	4.00E-01	2.84E-08	7.11E-08	3.00E-04	3.00E-04	2.37E-04
Total					3.32E-07				1.42E-02

WORKSHEET 7.33 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Ingestion
Receptor: Resident, Recreational,
Visitor/Trespasser Adult

Chemical Constituent of Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	6.28E+00	6.28E-03	1.52E-07	1.50E+00	2.28E-07	4.43E-07	3.00E-04	3.00E-04	1.48E-03
Lead	5.75E+01	5.75E-02							
Vanadium	2.15E+01	2.15E-02				1.51E-06	1.00E-03	1.00E-03	1.51E-03
Tetrachloroethene	2.52E+00	2.52E-03	6.09E-08	5.40E-01	3.29E-08	0.00E+00	1.00E-02	1.00E-02	0.00E+00
Trichloroethene	2.52E+00	2.52E-03	6.09E-08	4.00E-01	2.44E-08	0.00E+00	3.00E-04	3.00E-04	0.00E+00
Total					2.85E-07				2.99E-03

WORKSHEET 7.34 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Dermal
Receptor: Commercial/Industrial Worker

Chemical Constituent of Potential Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	6.28E+00	6.28E-06	1.76E-08	1.50E+00	2.64E-08	4.92E-08	3.00E-04	3.00E-04	1.64E-04	6.28E-09	1.00E-03				1	1
Lead	5.75E+01	5.75E-05								5.75E-09	1.00E-04				1	1
Vanadium	2.15E+01	2.15E-05				1.68E-07	2.60E-05	2.60E-05	6.47E-03	2.15E-08	1.00E-03				1	1
Tetrachloroethene	2.52E+00	2.52E-06	6.03E-07	5.40E-01	3.25E-07	0.00E+00	1.00E-02	6.00E-02	0.00E+00	2.16E-07	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1
Trichloroethene	2.52E+00	2.52E-06	1.70E-07	4.00E-01	6.79E-08	0.00E+00	3.00E-04	1.00E-02	0.00E+00	6.07E-08	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1
Total					4.20E-07				6.63E-03							

WORKSHEET 7.35 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Ingestion
Receptor: Commercial/Industrial Worker

Chemical Constituent of Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	6.28E+00	6.28E-03	1.10E-07	1.50E+00	1.65E-07	3.07E-07	3.00E-04	3.00E-04	1.02E-03
Lead	5.75E+01	5.75E-02							
Vanadium	2.15E+01	2.15E-02				1.05E-06	1.00E-03	1.00E-03	1.05E-03
Tetrachloroethene	2.52E+00	2.52E-03	4.41E-08	5.40E-01	2.38E-08	0.00E+00	1.00E-02	1.00E-02	0.00E+00
Trichloroethene	2.52E+00	2.52E-03	4.41E-08	4.00E-01	1.76E-08	0.00E+00	3.00E-04	3.00E-04	0.00E+00
Total					2.06E-07				2.08E-03

WORKSHEET 7.34 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Dermal
Receptor: Construction Worker

Chemical Constituent of Potential Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	6.28E+00	6.28E-06	2.61E-09	1.50E+00	3.91E-09	1.83E-07	3.00E-04	3.00E-04	6.09E-04	6.28E-09	1.00E-03				1	1
Lead	5.75E+01	5.75E-05								5.75E-09	1.00E-04				1	1
Vanadium	2.15E+01	2.15E-05				6.24E-07	2.60E-05	2.60E-05	2.40E-02	2.15E-08	1.00E-03				1	1
Tetrachloroethene	2.52E+00	2.52E-06	8.95E-08	5.40E-01	4.83E-08	0.00E+00	1.00E-02	6.00E-02	0.00E+00	2.16E-07	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1
Trichloroethene	2.52E+00	2.52E-06	2.52E-08	4.00E-01	1.01E-08	0.00E+00	3.00E-04	1.00E-02	0.00E+00	6.07E-08	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1
Total					6.23E-08				2.46E-02							

WORKSHEET 7.37 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Ingestion
Receptor: Construction Worker

Chemical Constituent of Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	6.28E+00	6.28E-03	3.95E-09	1.50E+00	5.93E-09	2.77E-07	3.00E-04	3.00E-04	9.22E-04
Lead	5.75E+01	5.75E-02							
Vanadium	2.15E+01	2.15E-02				9.46E-07	1.00E-03	1.00E-03	9.46E-04
Tetrachloroethene	2.52E+00	2.52E-03	1.59E-09	5.40E-01	8.57E-10	0.00E+00	1.00E-02	1.00E-02	0.00E+00
Trichloroethene	2.52E+00	2.52E-03	1.59E-09	4.00E-01	6.34E-10	0.00E+00	3.00E-04	3.00E-04	0.00E+00
Total					7.42E-09				1.87E-03

WORKSHEET 7.38 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Dermal
Receptor: Agricultural Worker

Chemical Constituent of Potential Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Dermal) (CW) mg/cm3	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) unitless	Absorbed Dose per Event (DAevent) mg/cm2-event	Permeability Coefficient Kp cm/hr	Lag Time Per Event tau hr/event	Time To Reach Steady-State t* hour	Permeability Ratio B	Exposure Time (ET) hours/day	Fraction Absorbed FA
Arsenic	6.28E+00	6.28E-06	7.83E-08	1.50E+00	1.17E-07	1.83E-07	3.00E-04	3.00E-04	6.09E-04	6.28E-09	1.00E-03				1	1
Lead	5.75E+01	5.75E-05								5.75E-09	1.00E-04				1	1
Vanadium	2.15E+01	2.15E-05				6.24E-07	2.60E-05	2.60E-05	2.40E-02	2.15E-08	1.00E-03				1	1
Tetrachloroethene	2.52E+00	2.52E-06	2.68E-06	5.40E-01	1.45E-06	0.00E+00	1.00E-02	6.00E-02	0.00E+00	2.16E-07	3.28E-02	8.91E-01	2.14E+00	1.62E-01	1	1
Trichloroethene	2.52E+00	2.52E-06	7.56E-07	4.00E-01	3.02E-07	0.00E+00	3.00E-04	1.00E-02	0.00E+00	6.07E-08	1.15E-02	5.72E-01	1.37E+00	5.08E-02	1	1
Total					1.87E-06				2.46E-02							

WORKSHEET 7.39 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 3 EPC Set: 3
Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Route: Ingestion
Receptor: Agricultural Worker

Chemical Constituent of Concern	Surface Water Concentration ug/L	Exposure Point Concentration (Oral) (CW) mg/L	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) unitless
Arsenic	6.28E+00	6.28E-03	1.19E-07	1.50E+00	1.78E-07	2.77E-07	3.00E-04	3.00E-04	9.22E-04
Lead	5.75E+01	5.75E-02							
Vanadium	2.15E+01	2.15E-02				9.46E-07	1.00E-03	1.00E-03	9.46E-04
Tetrachloroethene	2.52E+00	2.52E-03	4.76E-08	5.40E-01	2.57E-08	0.00E+00	1.00E-02	1.00E-02	0.00E+00
Trichloroethene	2.52E+00	2.52E-03	4.76E-08	4.00E-01	1.90E-08	0.00E+00	3.00E-04	3.00E-04	0.00E+00
Total					2.23E-07				1.87E-03

WORKSHEET 7.40 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Dermal

Receptor: Resident Child

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.54E+01	2.34E-06	1.50E+00	3.50E-06	2.73E-05	3.00E-04	3.00E-04	9.09E-02	3.00E-02
Chromium	3.42E+01				1.23E-05	7.50E-05	5.00E-04	1.63E-01	1.00E-02
Lead	1.62E+02								1.00E-02
Benzo(a)anthracene	9.81E-01	3.91E-07	7.30E-01	2.86E-07					1.30E-01
Benzo(a)pyrene	1.05E+00	4.19E-07	7.30E+00	3.06E-06					1.30E-01
Benzo(b)fluoranthene	1.45E+00	5.79E-07	7.30E-01	4.23E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	1.04E+00	4.16E-07	7.30E-01	3.04E-07					1.30E-01
Aroclor-1254 (PCB-1254)	6.46E-02	2.77E-08	2.00E+00	5.55E-08	3.24E-07	2.00E-05	5.00E-05	1.62E-02	1.40E-01
Aroclor-1260 (PCB-1260)	7.97E-02	3.43E-08	2.00E+00	6.85E-08					1.40E-01
Total				7.70E-06				2.70E-01	

WORKSHEET 7.41 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Dermal

Receptor: Resident Adult

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.54E+01	1.43E-06	1.50E+00	2.14E-06	4.16E-06	3.00E-04	3.00E-04	1.39E-02	3.00E-02
Chromium	3.42E+01				1.87E-06	7.50E-05	5.00E-04	2.50E-02	1.00E-02
Lead	1.62E+02								1.00E-02
Benzo(a)anthracene	9.81E-01	2.39E-07	7.30E-01	1.74E-07					1.30E-01
Benzo(a)pyrene	1.05E+00	2.56E-07	7.30E+00	1.87E-06					1.30E-01
Benzo(b)fluoranthene	1.45E+00	3.54E-07	7.30E-01	2.58E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	1.04E+00	2.54E-07	7.30E-01	1.86E-07					1.30E-01
Aroclor-1254 (PCB-1254)	6.46E-02	1.69E-08	2.00E+00	3.39E-08	4.94E-08	2.00E-05	5.00E-05	2.47E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.97E-02	2.09E-08	2.00E+00	4.18E-08					1.40E-01
Total				4.70E-06				4.13E-02	

WORKSHEET 7.42 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Resident Child

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.54E+01	2.78E-05	1.50E+00	4.17E-05	3.24E-04	3.00E-04	3.00E-04	1.08E+00
Chromium	3.42E+01				4.38E-04	3.00E-03	2.00E-02	1.46E-01
Lead	1.62E+02							
Benzo(a)anthracene	9.81E-01	1.08E-06	7.30E-01	7.85E-07				
Benzo(a)pyrene	1.05E+00	1.15E-06	7.30E+00	8.39E-06				
Benzo(b)fluoranthene	1.45E+00	1.59E-06	7.30E-01	1.16E-06				
Indeno(1,2,3-cd)pyrene	1.04E+00	1.14E-06	7.30E-01	8.35E-07				
Aroclor-1254 (PCB-1254)	6.46E-02	7.08E-08	2.00E+00	1.42E-07	8.26E-07	2.00E-05	5.00E-05	4.13E-02
Aroclor-1260 (PCB-1260)	7.97E-02	8.74E-08	2.00E+00	1.75E-07				
Total				5.32E-05				1.27E+00

WORKSHEET 7.43 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Resident Adult

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.54E+01	1.19E-05	1.50E+00	1.79E-05	3.48E-05	3.00E-04	3.00E-04	1.16E-01
Chromium	3.42E+01				4.69E-05	3.00E-03	2.00E-02	1.56E-02
Lead	1.62E+02							
Benzo(a)anthracene	9.81E-01	4.61E-07	7.30E-01	3.36E-07				
Benzo(a)pyrene	1.05E+00	4.93E-07	7.30E+00	3.60E-06				
Benzo(b)fluoranthene	1.45E+00	6.82E-07	7.30E-01	4.98E-07				
Indeno(1,2,3-cd)pyrene	1.04E+00	4.90E-07	7.30E-01	3.58E-07				
Aroclor-1254 (PCB-1254)	6.46E-02	3.03E-08	2.00E+00	6.07E-08	8.85E-08	2.00E-05	5.00E-05	4.42E-03
Aroclor-1260 (PCB-1260)	7.97E-02	3.75E-08	2.00E+00	7.49E-08				
Total				2.28E-05				1.36E-01

WORKSHEET 7.44 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Vapor

Exposure Route: Inhalation

Receptor: Resident Child

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Poin Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	2.54E+01			1.50E+01						
Chromium	3.42E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.62E+02									
Benzo(a)anthracene	9.81E-01	8.03E-08								8.19E-08
Benzo(a)pyrene	1.05E+00	3.77E-08	4.17E-10	3.10E+00	1.29E-09					3.59E-08
Benzo(b)fluoranthene	1.45E+00	2.65E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	1.04E+00	1.64E-08								1.57E-08
Aroclor-1254 (PCB-1254)	6.46E-02	3.18E-08	3.51E-10	2.00E+00	7.03E-10					4.92E-07
Aroclor-1260 (PCB-1260)	7.97E-02	4.14E-08	4.58E-10	2.00E+00	9.16E-10					5.19E-07
Total					2.91E-09				0.00E+00	

WORKSHEET 7.45 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Vapor

Exposure Route: Inhalation

Receptor: Resident Adult

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Poin Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	2.54E+01			1.50E+01						
Chromium	3.42E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.62E+02									
Benzo(a)anthracene	9.81E-01	8.03E-08								8.19E-08
Benzo(a)pyrene	1.05E+00	3.77E-08	2.95E-10	3.10E+00	9.13E-10					3.59E-08
Benzo(b)fluoranthene	1.45E+00	2.65E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	1.04E+00	1.64E-08								1.57E-08
Aroclor-1254 (PCB-1254)	6.46E-02	3.18E-08	2.48E-10	2.00E+00	4.97E-10					4.92E-07
Aroclor-1260 (PCB-1260)	7.97E-02	4.14E-08	3.24E-10	2.00E+00	6.48E-10					5.19E-07
Total					2.06E-09				0.00E+00	

WORKSHEET 7.46 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Particulates

Exposure Route: Inhalation

Receptor: Resident Child

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.54E+01	1.93E-08	2.13E-10	1.50E+01	3.20E-09					7.60E-10
Chromium	3.42E+01	2.60E-08	2.88E-10	4.20E+01	1.21E-08	3.36E-09	2.20E-06	2.20E-06	1.53E-03	7.60E-10
Lead	1.62E+02	1.23E-07								7.60E-10
Benzo(a)anthracene	9.81E-01	7.45E-10								7.60E-10
Benzo(a)pyrene	1.05E+00	7.97E-10	8.82E-12	3.10E+00	2.73E-11					7.60E-10
Benzo(b)fluoranthene	1.45E+00	1.10E-09								7.60E-10
Indeno(1,2,3-cd)pyrene	1.04E+00	7.93E-10								7.60E-10
Aroclor-1254 (PCB-1254)	6.46E-02	4.91E-11	5.43E-13	2.00E+00	1.09E-12					7.60E-10
Aroclor-1260 (PCB-1260)	7.97E-02	6.06E-11	6.70E-13	2.00E+00	1.34E-12					7.60E-10
Total					1.53E-08				1.53E-03	

WORKSHEET 7.47 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Particulates

Exposure Route: Inhalation

Receptor: Resident Adult

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.54E+01	1.93E-08	1.51E-10	1.50E+01	2.26E-09					7.60E-10
Chromium	3.42E+01	2.60E-08	2.04E-10	4.20E+01	8.55E-09	5.94E-10	2.20E-06	2.20E-06	2.70E-04	7.60E-10
Lead	1.62E+02	1.23E-07								7.60E-10
Benzo(a)anthracene	9.81E-01	7.45E-10								7.60E-10
Benzo(a)pyrene	1.05E+00	7.97E-10	6.24E-12	3.10E+00	1.93E-11					7.60E-10
Benzo(b)fluoranthene	1.45E+00	1.10E-09								7.60E-10
Indeno(1,2,3-cd)pyrene	1.04E+00	7.93E-10								7.60E-10
Aroclor-1254 (PCB-1254)	6.46E-02	4.91E-11	3.84E-13	2.00E+00	7.68E-13					7.60E-10
Aroclor-1260 (PCB-1260)	7.97E-02	6.06E-11	4.74E-13	2.00E+00	9.48E-13					7.60E-10
Total					1.08E-08				2.70E-04	

WORKSHEET 7.48 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Dermal

Receptor: Com. & Ind. Worker

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.54E+01	1.76E-06	1.50E+00	2.63E-06	4.92E-06	3.00E-04	3.00E-04	1.64E-02	3.00E-02
Chromium	3.42E+01				2.21E-06	7.50E-05	5.00E-04	2.95E-02	1.00E-02
Lead	1.62E+02								1.00E-02
Benzo(a)anthracene	9.81E-01	2.94E-07	7.30E-01	2.15E-07					1.30E-01
Benzo(a)pyrene	1.05E+00	3.15E-07	7.30E+00	2.30E-06					1.30E-01
Benzo(b)fluoranthene	1.45E+00	4.35E-07	7.30E-01	3.18E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	1.04E+00	3.13E-07	7.30E-01	2.28E-07					1.30E-01
Aroclor-1254 (PCB-1254)	6.46E-02	2.09E-08	2.00E+00	4.17E-08	5.84E-08	2.00E-05	5.00E-05	2.92E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.97E-02	2.57E-08	2.00E+00	5.15E-08					1.40E-01
Total				5.79E-06				4.88E-02	

WORKSHEET 7.49 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.54E+01	8.87E-06	1.50E+00	1.33E-05	2.48E-05	3.00E-04	3.00E-04	8.28E-02
Chromium	3.42E+01				3.35E-05	3.00E-03	2.00E-02	1.12E-02
Lead	1.62E+02							
Benzo(a)anthracene	9.81E-01	3.43E-07	7.30E-01	2.50E-07				
Benzo(a)pyrene	1.05E+00	3.67E-07	7.30E+00	2.68E-06				
Benzo(b)fluoranthene	1.45E+00	5.08E-07	7.30E-01	3.71E-07				
Indeno(1,2,3-cd)pyrene	1.04E+00	3.65E-07	7.30E-01	2.66E-07				
Aroclor-1254 (PCB-1254)	6.46E-02	2.26E-08	2.00E+00	4.51E-08	6.32E-08	2.00E-05	5.00E-05	3.16E-03
Aroclor-1260 (PCB-1260)	7.97E-02	2.79E-08	2.00E+00	5.57E-08				
Total				1.70E-05				9.71E-02

WORKSHEET 7.50 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Vapor

Exposure Route: Inhalation

Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Poin Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	2.54E+01			1.50E+01						
Chromium	3.42E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.62E+02									
Benzo(a)anthracene	9.81E-01	8.03E-08								8.19E-08
Benzo(a)pyrene	1.05E+00	3.77E-08	1.64E-10	3.10E+00	5.10E-10					3.59E-08
Benzo(b)fluoranthene	1.45E+00	2.65E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	1.04E+00	1.64E-08								1.57E-08
Aroclor-1254 (PCB-1254)	6.46E-02	3.18E-08	1.39E-10	2.00E+00	2.77E-10					4.92E-07
Aroclor-1260 (PCB-1260)	7.97E-02	4.14E-08	1.81E-10	2.00E+00	3.61E-10					5.19E-07
Total					1.15E-09				0.00E+00	

WORKSHEET 7.51 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4

Scenario Timeframe: Current/Future

Medium: Surface Soil

Exposure Medium: Outdoor Air - Particulates

Exposure Route: Inhalation

Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.54E+01	1.93E-08	8.42E-11	1.50E+01	1.26E-09					7.60E-10
Chromium	3.42E+01	2.60E-08	1.14E-10	4.20E+01	4.77E-09	3.18E-10	2.20E-06	2.20E-06	1.45E-04	7.60E-10
Lead	1.62E+02	1.23E-07								7.60E-10
Benzo(a)anthracene	9.81E-01	7.45E-10								7.60E-10
Benzo(a)pyrene	1.05E+00	7.97E-10	3.48E-12	3.10E+00	1.08E-11					7.60E-10
Benzo(b)fluoranthene	1.45E+00	1.10E-09								7.60E-10
Indeno(1,2,3-cd)pyrene	1.04E+00	7.93E-10								7.60E-10
Aroclor-1254 (PCB-1254)	6.46E-02	4.91E-11	2.14E-13	2.00E+00	4.28E-13					7.60E-10
Aroclor-1260 (PCB-1260)	7.97E-02	6.06E-11	2.65E-13	2.00E+00	5.29E-13					7.60E-10
Total					6.04E-09				1.45E-04	

WORKSHEET 7.52 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Dermal
Receptor: Construction Worker

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.25E+01	8.40E-08	1.50E+00	1.26E-07	5.88E-06	3.00E-04	3.00E-04	1.96E-02	3.00E-02
Chromium	3.07E+01				2.68E-06	7.50E-05	5.00E-04	5.36E-03	1.00E-02
Lead	1.54E+02								1.00E-02
Benzo(a)anthracene	8.53E-01	1.38E-08	7.30E-01	1.01E-08					1.30E-01
Benzo(a)pyrene	9.15E-01	1.48E-08	7.30E+00	1.08E-07					1.30E-01
Benzo(b)fluoranthene	1.26E+00	2.04E-08	7.30E-01	1.49E-08					1.30E-01
Indeno(1,2,3-cd)pyrene	7.55E-01	1.22E-08	7.30E-01	8.92E-09					1.30E-01
Aroclor-1254 (PCB-1254)	5.79E-02	1.01E-09	2.00E+00	2.02E-09	7.06E-08	2.00E-05	5.00E-05	1.41E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.07E-02	1.23E-09	2.00E+00	2.47E-09					1.40E-01
Total				2.73E-07				2.64E-02	

WORKSHEET 7.53 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Ingestion
Receptor: Construction Worker

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.25E+01	9.34E-07	1.50E+00	1.40E-06	6.54E-05	3.00E-04	3.00E-04	2.18E-01
Chromium	3.07E+01				8.93E-05	3.00E-03	2.00E-02	4.47E-03
Lead	1.54E+02							
Benzo(a)anthracene	8.53E-01	3.54E-08	7.30E-01	2.59E-08				
Benzo(a)pyrene	9.15E-01	3.80E-08	7.30E+00	2.77E-07				
Benzo(b)fluoranthene	1.26E+00	5.24E-08	7.30E-01	3.83E-08				
Indeno(1,2,3-cd)pyrene	7.55E-01	3.13E-08	7.30E-01	2.29E-08				
Aroclor-1254 (PCB-1254)	5.79E-02	2.40E-09	2.00E+00	4.81E-09	1.68E-07	2.00E-05	5.00E-05	3.36E-03
Aroclor-1260 (PCB-1260)	7.07E-02	2.94E-09	2.00E+00	5.87E-09				
Total				1.78E-06				2.26E-01

WORKSHEET 7.54 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Construction Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) m3/kg
Arsenic	2.25E+01			1.50E+01						
Chromium	3.07E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.54E+02									
Benzo(a)anthracene	8.53E-01	6.99E-08								8.19E-08
Benzo(a)pyrene	9.15E-01	3.28E-08	6.20E-11	3.10E+00	1.92E-10					3.59E-08
Benzo(b)fluoranthene	1.26E+00	2.31E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	1.19E-08								1.57E-08
Aroclor-1254 (PCB-1254)	5.79E-02	2.85E-08	5.37E-11	2.00E+00	1.07E-10					4.92E-07
Aroclor-1260 (PCB-1260)	7.07E-02	3.67E-08	6.93E-11	2.00E+00	1.39E-10					5.19E-07
Total					4.38E-10				0.00E+00	

WORKSHEET 7.55 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Construction Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.25E+01	1.71E-08	3.22E-11	1.50E+01	4.84E-10					7.60E-10
Chromium	3.07E+01	2.33E-08	4.41E-11	4.20E+01	1.85E-09	3.08E-09	2.20E-06	2.20E-06	1.40E-03	7.60E-10
Lead	1.54E+02	1.17E-07								7.60E-10
Benzo(a)anthracene	8.53E-01	6.48E-10								7.60E-10
Benzo(a)pyrene	9.15E-01	6.95E-10	1.31E-12	3.10E+00	4.07E-12					7.60E-10
Benzo(b)fluoranthene	1.26E+00	9.59E-10								7.60E-10
Indeno(1,2,3-cd)pyrene	7.55E-01	5.74E-10								7.60E-10
Aroclor-1254 (PCB-1254)	5.79E-02	4.40E-11	8.30E-14	2.00E+00	1.66E-13					7.60E-10
Aroclor-1260 (PCB-1260)	7.07E-02	5.37E-11	1.01E-13	2.00E+00	2.03E-13					7.60E-10
Total					2.34E-09				1.40E-03	

WORKSHEET 7.56 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Dermal
Receptor: Recreational Child

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.25E+01	1.15E-06	1.50E+00	1.73E-06	1.35E-05	3.00E-04	3.00E-04	4.49E-02	3.00E-02
Chromium	3.07E+01				6.13E-06	7.50E-05	5.00E-04	8.17E-02	1.00E-02
Lead	1.54E+02								1.00E-02
Benzo(a)anthracene	8.53E-01	1.90E-07	7.30E-01	1.38E-07					1.30E-01
Benzo(a)pyrene	9.15E-01	2.03E-07	7.30E+00	1.48E-06					1.30E-01
Benzo(b)fluoranthene	1.26E+00	2.81E-07	7.30E-01	2.05E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	7.55E-01	1.68E-07	7.30E-01	1.22E-07					1.30E-01
Aroclor-1254 (PCB-1254)	5.79E-02	1.39E-08	2.00E+00	2.77E-08	1.62E-07	2.00E-05	5.00E-05	8.08E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.07E-02	1.69E-08	2.00E+00	3.38E-08					1.40E-01
Total				3.74E-06				1.35E-01	

WORKSHEET 7.57 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Dermal
Receptor: Recreational Adult

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.25E+01	7.04E-07	1.50E+00	1.06E-06	2.05E-06	3.00E-04	3.00E-04	6.85E-03	3.00E-02
Chromium	3.07E+01				9.36E-07	7.50E-05	5.00E-04	1.25E-02	1.00E-02
Lead	1.54E+02								1.00E-02
Benzo(a)anthracene	8.53E-01	1.16E-07	7.30E-01	8.46E-08					1.30E-01
Benzo(a)pyrene	9.15E-01	1.24E-07	7.30E+00	9.07E-07					1.30E-01
Benzo(b)fluoranthene	1.26E+00	1.71E-07	7.30E-01	1.25E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	7.55E-01	1.02E-07	7.30E-01	7.48E-08					1.30E-01
Aroclor-1254 (PCB-1254)	5.79E-02	8.46E-09	2.00E+00	1.69E-08	2.47E-08	2.00E-05	5.00E-05	1.23E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.07E-02	1.03E-08	2.00E+00	2.07E-08					1.40E-01
Total				2.29E-06				2.06E-02	

WORKSHEET 7.58 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Ingestion
Receptor: Recreational Child

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.25E+01	7.36E-07	1.50E+00	1.10E-06	2.15E-06	3.00E-04	3.00E-04	7.15E-03
Chromium	3.07E+01				2.93E-06	3.00E-03	2.00E-02	9.77E-04
Lead	1.54E+02							
Benzo(a)anthracene	8.53E-01	2.79E-08	7.30E-01	2.04E-08				
Benzo(a)pyrene	9.15E-01	2.99E-08	7.30E+00	2.18E-07				
Benzo(b)fluoranthene	1.26E+00	4.13E-08	7.30E-01	3.02E-08				
Indeno(1,2,3-cd)pyrene	7.55E-01	2.47E-08	7.30E-01	1.80E-08				
Aroclor-1254 (PCB-1254)	5.79E-02	1.89E-09	2.00E+00	3.79E-09	5.52E-09	2.00E-05	5.00E-05	2.76E-04
Aroclor-1260 (PCB-1260)	7.07E-02	2.31E-09	2.00E+00	4.63E-09				
Total				1.40E-06				8.41E-03

WORKSHEET 7.59 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Ingestion
Receptor: Recreational Adult

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.25E+01	7.36E-07	1.50E+00	1.10E-06	2.15E-06	3.00E-04	3.00E-04	7.15E-03
Chromium	3.07E+01				2.93E-06	3.00E-03	2.00E-02	9.77E-04
Lead	1.54E+02							
Benzo(a)anthracene	8.53E-01	2.79E-08	7.30E-01	2.04E-08				
Benzo(a)pyrene	9.15E-01	2.99E-08	7.30E+00	2.18E-07				
Benzo(b)fluoranthene	1.26E+00	4.13E-08	7.30E-01	3.02E-08				
Indeno(1,2,3-cd)pyrene	7.55E-01	2.47E-08	7.30E-01	1.80E-08				
Aroclor-1254 (PCB-1254)	5.79E-02	1.89E-09	2.00E+00	3.79E-09	5.52E-09	2.00E-05	5.00E-05	2.76E-04
Aroclor-1260 (PCB-1260)	7.07E-02	2.31E-09	2.00E+00	4.63E-09				
Total				1.40E-06				8.41E-03

WORKSHEET 7.60 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Child

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) m3/kg
Arsenic	2.25E+01			1.50E+01						
Chromium	3.07E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.54E+02									
Benzo(a)anthracene	8.53E-01	6.99E-08								8.19E-08
Benzo(a)pyrene	9.15E-01	3.28E-08	3.02E-11	3.10E+00	9.35E-11					3.59E-08
Benzo(b)fluoranthene	1.26E+00	2.31E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	1.19E-08								1.57E-08
Aroclor-1254 (PCB-1254)	5.79E-02	2.85E-08	2.61E-11	2.00E+00	5.23E-11					4.92E-07
Aroclor-1260 (PCB-1260)	7.07E-02	3.67E-08	3.37E-11	2.00E+00	6.74E-11					5.19E-07
Total					2.13E-10				0.00E+00	

WORKSHEET 7.61 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Adult

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) m3/kg
Arsenic	2.25E+01			1.50E+01						
Chromium	3.07E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.54E+02									
Benzo(a)anthracene	8.53E-01	6.99E-08								8.19E-08
Benzo(a)pyrene	9.15E-01	3.28E-08	9.91E-11	3.10E+00	3.07E-10					3.59E-08
Benzo(b)fluoranthene	1.26E+00	2.31E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	1.19E-08								1.57E-08
Aroclor-1254 (PCB-1254)	5.79E-02	2.85E-08	8.59E-11	2.00E+00	1.72E-10					4.92E-07
Aroclor-1260 (PCB-1260)	7.07E-02	3.67E-08	1.11E-10	2.00E+00	2.22E-10					5.19E-07
Total					7.01E-10				0.00E+00	

WORKSHEET 7.62 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Recreational Child

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.25E+01	1.71E-08	1.57E-11	1.50E+01	2.35E-10					7.60E-10
Chromium	3.07E+01	2.33E-08	2.14E-11	4.20E+01	9.01E-10	2.50E-10	2.20E-06	2.20E-06	1.14E-04	7.60E-10
Lead	1.54E+02	1.17E-07								7.60E-10
Benzo(a)anthracene	8.53E-01	6.48E-10								7.60E-10
Benzo(a)pyrene	9.15E-01	6.95E-10	6.39E-13	3.10E+00	1.98E-12					7.60E-10
Benzo(b)fluoranthene	1.26E+00	9.59E-10								7.60E-10
Indeno(1,2,3-cd)pyrene	7.55E-01	5.74E-10								7.60E-10
Aroclor-1254 (PCB-1254)	5.79E-02	4.40E-11	4.04E-14	2.00E+00	8.08E-14					7.60E-10
Aroclor-1260 (PCB-1260)	7.07E-02	5.37E-11	4.93E-14	2.00E+00	9.87E-14					7.60E-10
Total					1.14E-09				1.14E-04	

WORKSHEET 7.63 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Recreational Adult

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.25E+01	1.71E-08	5.16E-11	1.50E+01	7.74E-10					7.60E-10
Chromium	3.07E+01	2.33E-08	7.05E-11	4.20E+01	2.96E-09	2.06E-10	2.20E-06	2.20E-06	9.34E-05	7.60E-10
Lead	1.54E+02	1.17E-07								7.60E-10
Benzo(a)anthracene	8.53E-01	6.48E-10								7.60E-10
Benzo(a)pyrene	9.15E-01	6.95E-10	2.10E-12	3.10E+00	6.51E-12					7.60E-10
Benzo(b)fluoranthene	1.26E+00	9.59E-10								7.60E-10
Indeno(1,2,3-cd)pyrene	7.55E-01	5.74E-10								7.60E-10
Aroclor-1254 (PCB-1254)	5.79E-02	4.40E-11	1.33E-13	2.00E+00	2.66E-13					7.60E-10
Aroclor-1260 (PCB-1260)	7.07E-02	5.37E-11	1.62E-13	2.00E+00	3.24E-13					7.60E-10
Total					3.74E-09				9.34E-05	

WORKSHEET 7.64 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Dermal
Receptor: Visitor/Trespasser

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.25E+01	8.67E-08	1.50E+00	1.30E-07	2.53E-07	3.00E-04	3.00E-04	8.43E-04	3.00E-02
Chromium	3.07E+01				1.15E-07	7.50E-05	5.00E-04	1.54E-03	1.00E-02
Lead	1.54E+02								1.00E-02
Benzo(a)anthracene	8.53E-01	1.43E-08	7.30E-01	1.04E-08					1.30E-01
Benzo(a)pyrene	9.15E-01	1.53E-08	7.30E+00	1.12E-07					1.30E-01
Benzo(b)fluoranthene	1.26E+00	2.11E-08	7.30E-01	1.54E-08					1.30E-01
Indeno(1,2,3-cd)pyrene	7.55E-01	1.26E-08	7.30E-01	9.21E-09					1.30E-01
Aroclor-1254 (PCB-1254)	5.79E-02	1.04E-09	2.00E+00	2.08E-09	3.04E-09	2.00E-05	5.00E-05	1.52E-04	1.40E-01
Aroclor-1260 (PCB-1260)	7.07E-02	1.27E-09	2.00E+00	2.54E-09					1.40E-01
Total				2.81E-07				2.53E-03	

WORKSHEET 7.65 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Ingestion
Receptor: Visitor/Trespasser

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.25E+01	9.05E-08	1.50E+00	1.36E-07	2.64E-07	3.00E-04	3.00E-04	8.80E-04
Chromium	3.07E+01				3.61E-07	3.00E-03	2.00E-02	1.20E-04
Lead	1.54E+02							
Benzo(a)anthracene	8.53E-01	3.44E-09	7.30E-01	2.51E-09				
Benzo(a)pyrene	9.15E-01	3.68E-09	7.30E+00	2.69E-08				
Benzo(b)fluoranthene	1.26E+00	5.08E-09	7.30E-01	3.71E-09				
Indeno(1,2,3-cd)pyrene	7.55E-01	3.04E-09	7.30E-01	2.22E-09				
Aroclor-1254 (PCB-1254)	5.79E-02	2.33E-10	2.00E+00	4.66E-10	6.80E-10	2.00E-05	5.00E-05	3.40E-05
Aroclor-1260 (PCB-1260)	7.07E-02	2.85E-10	2.00E+00	5.69E-10				
Total				1.72E-07				1.03E-03

WORKSHEET 7.66 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Outdoor Air - Particulates
Receptor: Visitor/Trespasser

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) m3/kg
Arsenic	2.25E+01			1.50E+01						
Chromium	3.07E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.54E+02									
Benzo(a)anthracene	8.53E-01	6.99E-08								8.19E-08
Benzo(a)pyrene	9.15E-01	3.28E-08	1.76E-11	3.10E+00	5.46E-11					3.59E-08
Benzo(b)fluoranthene	1.26E+00	2.31E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	1.19E-08								1.57E-08
Aroclor-1254 (PCB-1254)	5.79E-02	2.85E-08	1.53E-11	2.00E+00	3.05E-11					4.92E-07
Aroclor-1260 (PCB-1260)	7.07E-02	3.67E-08	1.97E-11	2.00E+00	3.94E-11					5.19E-07
Total					1.25E-10				0.00E+00	

WORKSHEET 7.67 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Inhalation
Exposure Route: Outdoor Air - Particulates
Receptor: Visitor/Trespasser

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.25E+01	1.71E-08	9.17E-12	1.50E+01	1.38E-10					7.60E-10
Chromium	3.07E+01	2.33E-08	1.25E-11	4.20E+01	5.26E-10	3.65E-11	2.20E-06	2.20E-06	1.66E-05	7.60E-10
Lead	1.54E+02	1.17E-07								7.60E-10
Benzo(a)anthracene	8.53E-01	6.48E-10								7.60E-10
Benzo(a)pyrene	9.15E-01	6.95E-10	3.73E-13	3.10E+00	1.16E-12					7.60E-10
Benzo(b)fluoranthene	1.26E+00	9.59E-10								7.60E-10
Indeno(1,2,3-cd)pyrene	7.55E-01	5.74E-10								7.60E-10
Aroclor-1254 (PCB-1254)	5.79E-02	4.40E-11	2.36E-14	2.00E+00	4.72E-14					7.60E-10
Aroclor-1260 (PCB-1260)	7.07E-02	5.37E-11	2.88E-14	2.00E+00	5.76E-14					7.60E-10
Total					6.65E-10				1.66E-05	

WORKSHEET 7.68 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Dermal
Receptor: Agricultural Worker

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	2.25E+01	2.52E-06	1.50E+00	3.78E-06	5.88E-06	3.00E-04	3.00E-04	1.96E-02	3.00E-02
Chromium	3.07E+01				2.68E-06	7.50E-05	5.00E-04	3.57E-02	1.00E-02
Lead	1.54E+02								1.00E-02
Benzo(a)anthracene	8.53E-01	4.15E-07	7.30E-01	3.03E-07					1.30E-01
Benzo(a)pyrene	9.15E-01	4.44E-07	7.30E+00	3.24E-06					1.30E-01
Benzo(b)fluoranthene	1.26E+00	6.13E-07	7.30E-01	4.48E-07					1.30E-01
Indeno(1,2,3-cd)pyrene	7.55E-01	3.67E-07	7.30E-01	2.68E-07					1.30E-01
Aroclor-1254 (PCB-1254)	5.79E-02	3.03E-08	2.00E+00	6.06E-08	7.06E-08	2.00E-05	5.00E-05	3.53E-03	1.40E-01
Aroclor-1260 (PCB-1260)	7.07E-02	3.70E-08	2.00E+00	7.40E-08					1.40E-01
Total				8.18E-06				5.89E-02	

WORKSHEET 7.69 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Route: Ingestion
Receptor: Agricultural Worker

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	2.25E+01	2.64E-05	1.50E+00	3.96E-05	6.16E-05	3.00E-04	3.00E-04	2.05E-01
Chromium	3.07E+01				8.42E-05	3.00E-03	2.00E-02	2.81E-02
Lead	1.54E+02							
Benzo(a)anthracene	8.53E-01	1.00E-06	7.30E-01	7.31E-07				
Benzo(a)pyrene	9.15E-01	1.07E-06	7.30E+00	7.84E-06				
Benzo(b)fluoranthene	1.26E+00	1.48E-06	7.30E-01	1.08E-06				
Indeno(1,2,3-cd)pyrene	7.55E-01	8.86E-07	7.30E-01	6.47E-07				
Aroclor-1254 (PCB-1254)	5.79E-02	6.80E-08	2.00E+00	1.36E-07	1.59E-07	2.00E-05	5.00E-05	7.93E-03
Aroclor-1260 (PCB-1260)	7.07E-02	8.30E-08	2.00E+00	1.66E-07				
Total				5.02E-05				2.41E-01

WORKSHEET 7.70 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Agricultural Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) m3/kg
Arsenic	2.25E+01			1.50E+01						
Chromium	3.07E+01			4.20E+01			2.20E-06	2.20E-06		
Lead	1.54E+02									
Benzo(a)anthracene	8.53E-01	6.99E-08								8.19E-08
Benzo(a)pyrene	9.15E-01	3.28E-08	1.86E-09	3.10E+00	5.76E-09					3.59E-08
Benzo(b)fluoranthene	1.26E+00	2.31E-07								1.83E-07
Indeno(1,2,3-cd)pyrene	7.55E-01	1.19E-08								1.57E-08
Aroclor-1254 (PCB-1254)	5.79E-02	2.85E-08	1.61E-09	2.00E+00	3.22E-09					4.92E-07
Aroclor-1260 (PCB-1260)	7.07E-02	3.67E-08	2.08E-09	2.00E+00	4.16E-09					5.19E-07
Total					1.31E-08				0.00E+00	

WORKSHEET 7.71 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 4
Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Agricultural Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	2.25E+01	1.71E-08	9.67E-10	1.50E+01	1.45E-08					7.60E-10
Chromium	3.07E+01	2.33E-08	1.32E-09	4.20E+01	5.55E-08	3.08E-09	2.20E-06	2.20E-06	1.40E-03	7.60E-10
Lead	1.54E+02	1.17E-07								7.60E-10
Benzo(a)anthracene	8.53E-01	6.48E-10								7.60E-10
Benzo(a)pyrene	9.15E-01	6.95E-10	3.94E-11	3.10E+00	1.22E-10					7.60E-10
Benzo(b)fluoranthene	1.26E+00	9.59E-10								7.60E-10
Indeno(1,2,3-cd)pyrene	7.55E-01	5.74E-10								7.60E-10
Aroclor-1254 (PCB-1254)	5.79E-02	4.40E-11	2.49E-12	2.00E+00	4.98E-12					7.60E-10
Aroclor-1260 (PCB-1260)	7.07E-02	5.37E-11	3.04E-12	2.00E+00	6.08E-12					7.60E-10
Total					7.02E-08				1.40E-03	

WORKSHEET 7.72 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Resident Child

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	7.06E+00			1.50E+01						
Lead	2.01E+01									
Tetrachloroethene	4.30E-01	1.25E-04	1.38E-06	2.10E-02	2.91E-08	1.61E-05	1.00E-02	1.00E-02	1.61E-03	2.91E-04
Trichloroethene	5.94E-02	3.12E-05	3.45E-07	4.00E-01	1.38E-07	4.02E-06	1.00E-02	1.00E-02	4.02E-04	5.24E-04
Total					1.67E-07				2.02E-03	

WORKSHEET 7.73 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Resident Adult

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	7.06E+00			1.50E+01						
Lead	2.01E+01									
Tetrachloroethene	4.30E-01	1.25E-04	6.46E-07	2.10E-02	1.36E-08	1.89E-06	1.00E-02	1.00E-02	1.89E-04	2.91E-04
Trichloroethene	5.94E-02	3.12E-05	1.61E-07	4.00E-01	6.44E-08	4.70E-07	1.00E-02	1.00E-02	4.70E-05	5.24E-04
Total					7.80E-08				2.35E-04	

WORKSHEET 7.74 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Com. & Ind. Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	7.06E+00			1.50E+01						
Lead	2.01E+01									
Tetrachloroethene	4.30E-01	1.25E-04	3.61E-07	2.10E-02	7.58E-09	1.01E-06	1.00E-02	1.00E-02	1.01E-04	2.91E-04
Trichloroethene	5.94E-02	3.12E-05	8.98E-08	4.00E-01	3.59E-08	2.52E-07	1.00E-02	1.00E-02	2.52E-05	5.24E-04
Total					4.35E-08				1.26E-04	

WORKSHEET 7.75 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Construction Worker

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	6.70E+00			1.50E+01						
Lead	2.56E+01									
Tetrachloroethene	3.26E-01	9.47E-05	1.79E-07	2.10E-02	3.75E-09	1.25E-05	1.00E-02	1.00E-02	1.25E-03	2.91E-04
Trichloroethene	6.08E-02	3.19E-05	6.01E-08	4.00E-01	2.40E-08	4.21E-06	1.00E-02	1.00E-02	4.21E-04	5.24E-04
Total					2.78E-08				1.67E-03	

WORKSHEET 7.76 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Construction Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	6.70E+00	5.09E-09	9.60E-12	1.50E+01	1.44E-10					7.60E-10
Lead	2.56E+01	1.94E-08								7.60E-10
Tetrachloroethene	3.26E-01	2.47E-10	4.67E-13	2.10E-02	9.81E-15	3.27E-11	1.00E-02	1.00E-02	3.27E-09	7.60E-10
Trichloroethene	6.08E-02	4.62E-11	8.71E-14	4.00E-01	3.48E-14	6.10E-12	1.00E-02	1.00E-02	6.10E-10	7.60E-10
Total					1.44E-10				3.88E-09	

WORKSHEET 7.75 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Child

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	6.70E+00			1.50E+01						
Lead	2.56E+01									
Tetrachloroethene	3.26E-01	9.47E-05	8.70E-08	2.10E-02	1.83E-09	1.01E-06	1.00E-02	1.00E-02	1.01E-04	2.91E-04
Trichloroethene	6.08E-02	3.19E-05	2.93E-08	4.00E-01	1.17E-08	3.41E-07	1.00E-02	1.00E-02	3.41E-05	5.24E-04
Total					1.35E-08				1.36E-04	

WORKSHEET 7.78 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Recreational Adult

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	6.70E+00			1.50E+01						
Lead	2.56E+01									
Tetrachloroethene	3.26E-01	9.47E-05	2.86E-07	2.10E-02	6.00E-09	8.34E-07	1.00E-02	1.00E-02	8.34E-05	2.91E-04
Trichloroethene	6.08E-02	3.19E-05	9.62E-08	4.00E-01	3.85E-08	2.81E-07	1.00E-02	1.00E-02	2.81E-05	5.24E-04
Total					4.45E-08				1.11E-04	

WORKSHEET 7.79 CALCULATION OF RISK
Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Visitor/Trespasser

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	6.70E+00			1.50E+01						
Lead	2.56E+01									
Tetrachloroethene	3.26E-01	9.47E-05	5.08E-08	2.10E-02	1.07E-09	1.48E-07	1.00E-02	1.00E-02	1.48E-05	2.91E-04
Trichloroethene	6.08E-02	3.19E-05	1.71E-08	4.00E-01	6.84E-09	4.99E-08	1.00E-02	1.00E-02	4.99E-06	5.24E-04
Total					7.90E-09				1.98E-05	

WORKSHEET 7.80 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Vapors
Exposure Route: Inhalation
Receptor: Agricultural Worker

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Volatilization Factor (VF) kg/m3
Arsenic	6.70E+00			1.50E+01						
Lead	2.56E+01									
Tetrachloroethene	3.26E-01	9.47E-05	5.36E-06	2.10E-02	1.13E-07	1.25E-05	1.00E-02	1.00E-02	1.25E-03	2.91E-04
Trichloroethene	6.08E-02	3.19E-05	1.80E-06	4.00E-01	7.21E-07	4.21E-06	1.00E-02	1.00E-02	4.21E-04	5.24E-04
Total					8.34E-07				1.67E-03	

WORKSHEET 7.81 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 5
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Outdoor Air - Particulates
Exposure Route: Inhalation
Receptor: Agricultural Worker

Chemical Constituent of Concern	Soil Concentration mg/kg	Exposure Point Concentration (Inhalation) (CA) mg/m3	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Inhalation Cancer Slope Factor CSFi 1/(mg/kg-day)	Cancer Risk (CDIc*CSFi) Inhalation unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Inhalation Reference Dose (chronic) RfDi mg/kg-day	Inhalation Reference Dose (subchronic) RfDi mg/kg-day	Hazard Quotient (CDIn/RfDi) Inhalation unitless	Particulate Emission Factor (PEF) kg/m3
Arsenic	6.70E+00	5.09E-09	2.88E-10	1.50E+01	4.32E-09					7.60E-10
Lead	2.56E+01	1.94E-08								7.60E-10
Tetrachloroethene	3.26E-01	2.47E-10	1.40E-11	2.10E-02	2.94E-13	3.27E-11	1.00E-02	1.00E-02	3.27E-09	7.60E-10
Trichloroethene	6.08E-02	4.62E-11	2.61E-12	4.00E-01	1.05E-12	6.10E-12	1.00E-02	1.00E-02	6.10E-10	7.60E-10
Total					4.32E-09				3.88E-09	

WORKSHEET 7.82 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 6
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil to depth of 15 feet
Exposure Route: Dermal
Receptor: Construction Worker

Chemical Constituent of Potential Concern	Exposure Point Concentration (Dermal) (CW) mg/kg	Dermally Absorbed Dose (Cancer) (DADc) mg/kg-day	Adjusted Dermal Cancer Slope Factor CSFd 1/(mg/kg-day)	Cancer Risk (DADc*CSFd) Dermal unitless	Dermally Absorbed Dose (Non-Cancer) (DADn) mg/kg-day	Adjusted Dermal Reference Dose (chronic) RfDd mg/kg-day	Adjusted Dermal Reference Dose (subchronic) RfDd mg/kg-day	Hazard Quotient (DADn/RfDd) Dermal unitless	Absorption Factor (ABS)
Arsenic	7.00E+00				1.83E-06	3.00E-04	3.00E-04	6.10E-03	3.00E-02
Lead	2.57E+01								1.00E-02
Tetrachloroethene	1.86E-01	6.93E-10	5.40E-01	3.74E-10	4.85E-08	1.00E-02	1.00E-02	4.85E-06	3.00E-02
Trichloroethene	4.20E-03				1.10E-09	3.00E-04	3.00E-04	3.66E-06	3.00E-02

WORKSHEET 7.83 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set: 6
Scenario Timeframe: Current/Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil to depth of 15 feet
Exposure Route: Ingestion
Receptor: Construction Worker

Chemical Constituent of Concern	Exposure Point Concentration (Oral) (CS) mg/kg	Chronic Daily Intake (Cancer) (CDIc) mg/kg-day	Oral Cancer Slope Factor CSFo 1/(mg/kg-day)	Cancer Risk (CDIc*CSFo) Oral unitless	Chronic Daily Intake (Non-Cancer) (CDIn) mg/kg-day	Oral Reference Dose (chronic) RfDo mg/kg-day	Oral Reference Dose (subchronic) RfDo mg/kg-day	Hazard Quotient (CDIn/RfDo) Oral unitless
Arsenic	7.00E+00	2.90E-07	1.50E+00	4.36E-07	2.03E-05	3.00E-04	3.00E-04	6.78E-02
Lead	2.57E+01							
Tetrachloroethene	1.86E-01	7.70E-09	5.40E-01	4.16E-09	5.39E-07	1.00E-02	1.00E-02	5.39E-05
Trichloroethene	4.20E-03	1.74E-10	4.00E-01	6.97E-11	1.22E-08	3.00E-04	3.00E-04	4.07E-05
Total				4.40E-07				6.79E-02

WORKSHEET 7.84 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 1, Overburden Wells
Scenario Timeframe: Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Resident Child

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Radium 226	1.01E+00	1.00E+00	2.10E+03	2.12E-03	2.28E+00	4.84E-03	9.58E-04	2.03E-06	2.22E-03	4.71E-06
Neptunium 237	4.36E-03	1.00E+00	2.10E+03	9.16E-06	5.28E-01	4.83E-06	3.43E-04	3.14E-09	5.66E-04	5.18E-09
Plutonium 239	4.38E-03	1.00E+00	2.10E+03	9.20E-06	1.23E+00	1.13E-05	2.88E-04	2.65E-09	9.10E-04	8.37E-09
Uranium 238	1.39E+00	1.00E+00	2.10E+03	2.92E-03	3.00E+02	8.76E-01	1.50E-04	4.38E-07	2.50E-04	7.30E-07
Uranium 235	5.04E-02	1.00E+00	2.10E+03	1.06E-04	3.20E+02	3.39E-02	1.70E-04	1.80E-08	2.70E-04	2.86E-08
Uranium 234	1.64E+00	1.00E+00	2.10E+03	3.44E-03	3.30E+02	1.14E+00	1.70E-04	5.85E-07	2.70E-04	9.30E-07
Thorium 232	5.55E-02	1.00E+00	2.10E+03	1.17E-04	1.30E+03	1.52E-01	2.20E-04	2.56E-08	3.30E-04	3.85E-08
Thorium 230	4.75E-02	1.00E+00	2.10E+03	9.98E-05	1.14E+03	1.14E-01	1.86E-04	1.86E-08	2.90E-04	2.89E-08
Technetium 99	4.53E+02	1.00E+00	2.10E+03	9.51E-01	8.50E+00	8.09E+00	7.60E-06	7.23E-06	1.30E-05	1.24E-05
Total						1.04E+01		1.04E-05		1.88E-05
						1.73E+00	mrem/yr			

WORKSHEET 7.85 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 1, Overburden Wells
Scenario Timeframe: Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Resident Adult

Radiological Constituent of Concern	Groundwater Concentration	Exposure Time (ET)	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/l	liters/day	liters	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	1.01E+00	2.00E+00	1.68E+04	1.70E-02	1.03E+00	1.75E-02	9.58E-04	1.63E-05	2.22E-03	3.77E-05
Neptunium 237	4.36E-03	2.00E+00	1.68E+04	7.32E-05	3.96E-01	2.90E-05	3.43E-04	2.51E-08	5.66E-04	4.15E-08
Plutonium 239	4.38E-03	2.00E+00	1.68E+04	7.36E-05	9.28E-01	6.83E-05	2.88E-04	2.12E-08	9.10E-04	6.70E-08
Uranium 238	1.39E+00	2.00E+00	1.68E+04	2.34E-02	1.70E+02	3.97E+00	2.20E-05	5.14E-07	3.20E-05	7.47E-07
Uranium 235	5.04E-02	2.00E+00	1.68E+04	8.47E-04	1.70E+02	1.44E-01	2.30E-05	1.95E-08	3.40E-05	2.88E-08
Uranium 234	1.64E+00	2.00E+00	1.68E+04	2.76E-02	1.80E+02	4.96E+00	2.40E-05	6.61E-07	3.50E-05	9.64E-07
Thorium 232	5.55E-02	2.00E+00	1.68E+04	9.32E-04	8.53E+02	7.95E-01	5.80E-05	5.41E-08	5.80E-05	5.41E-08
Thorium 230	4.75E-02	2.00E+00	1.68E+04	7.98E-04	7.91E+02	6.31E-01	4.37E-05	3.49E-08	6.11E-05	4.88E-08
Technetium 99	4.53E+02	2.00E+00	1.68E+04	7.61E+00	2.40E+00	1.83E+01	7.60E-07	5.78E-06	7.60E-07	5.78E-06
Total						2.88E+01		2.34E-05		4.54E-05
						1.20E+00	mrem/yr			

WORKSHEET 7.86 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 1, Overburden Wells
Scenario Timeframe: Future
Medium: Overburden Groundwater
Exposure Medium: Groundwater
Exposure Route: Ingestion
Receptor: Industrial Worker

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Faxctor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Radium 226	1.01E+00	1.00E+00	6.25E+03	6.31E-03	1.03E+00	6.50E-03	9.58E-04	6.05E-06	2.22E-03	1.40E-05
Neptunium 237	4.36E-03	1.00E+00	6.25E+03	2.73E-05	3.96E-01	1.08E-05	3.43E-04	9.35E-09	5.66E-04	1.54E-08
Plutonium 239	4.38E-03	1.00E+00	6.25E+03	2.74E-05	9.28E-01	2.54E-05	2.88E-04	7.88E-09	9.10E-04	2.49E-08
Uranium 238	1.39E+00	1.00E+00	6.25E+03	8.69E-03	1.70E+02	1.48E+00	2.20E-05	1.91E-07	3.20E-05	2.78E-07
Uranium 235	5.04E-02	1.00E+00	6.25E+03	3.15E-04	1.70E+02	5.36E-02	2.30E-05	7.25E-09	3.40E-05	1.07E-08
Uranium 234	1.64E+00	1.00E+00	6.25E+03	1.03E-02	1.80E+02	1.85E+00	2.40E-05	2.46E-07	3.50E-05	3.59E-07
Thorium 232	5.55E-02	1.00E+00	6.25E+03	3.47E-04	8.53E+02	2.96E-01	5.80E-05	2.01E-08	5.80E-05	2.01E-08
Thorium 230	4.75E-02	1.00E+00	6.25E+03	2.97E-04	7.91E+02	2.35E-01	4.37E-05	1.30E-08	6.11E-05	1.81E-08
Technetium 99	4.53E+02	1.00E+00	6.25E+03	2.83E+00	2.40E+00	6.80E+00	7.60E-07	2.15E-06	7.60E-07	2.15E-06
Total						1.07E+01		8.69E-06		1.69E-05
						4.28E-01	mrem/yr			

WORKSHEET 7.87 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 2, Bedrock Wells

Scenario Timeframe: Future

Medium: Bedrock Groundwater

Exposure Medium: Groundwater

Exposure Route: Ingestion

Receptor: Resident Child

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Radium 226	1.66E+00	1.00E+00	2.10E+03	3.49E-03	2.28E+00	7.95E-03	9.58E-04	3.34E-06	2.22E-03	7.74E-06
Neptunium 237	4.25E-03	1.00E+00	2.10E+03	8.93E-06	5.28E-01	4.71E-06	3.43E-04	3.06E-09	5.66E-04	5.05E-09
Plutonium 239	1.24E-02	1.00E+00	2.10E+03	2.60E-05	1.23E+00	3.20E-05	2.88E-04	7.50E-09	9.10E-04	2.37E-08
Uranium 238	7.05E-01	1.00E+00	2.10E+03	1.48E-03	3.00E+02	4.44E-01	1.50E-04	2.22E-07	2.50E-04	3.70E-07
Uranium 235	5.72E-02	1.00E+00	2.10E+03	1.20E-04	3.20E+02	3.84E-02	1.70E-04	2.04E-08	2.70E-04	3.24E-08
Uranium 234	6.91E+00	1.00E+00	2.10E+03	1.45E-02	3.30E+02	4.79E+00	1.70E-04	2.47E-06	2.70E-04	3.92E-06
Thorium 232	3.58E-02	1.00E+00	2.10E+03	7.52E-05	1.30E+03	9.77E-02	2.20E-04	1.65E-08	3.30E-04	2.48E-08
Thorium 230	3.17E-02	1.00E+00	2.10E+03	6.66E-05	1.14E+03	7.59E-02	1.86E-04	1.24E-08	2.90E-04	1.93E-08
Technetium 99	4.47E+00	1.00E+00	2.10E+03	9.39E-03	8.50E+00	7.98E-02	7.60E-06	7.13E-08	1.30E-05	1.22E-07
Total						5.53E+00		6.16E-06		1.23E-05
						9.22E-01	mrem/yr			

WORKSHEET 7.88 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 2, Bedrock Wells

Scenario Timeframe: Future

Medium: Bedrock Groundwater

Exposure Medium: Groundwater

Exposure Route: Ingestion

Receptor: Resident Adult

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Radium 226	1.66E+00	2.00E+00	1.68E+04	2.79E-02	1.03E+00	2.87E-02	9.58E-04	2.67E-05	2.22E-03	6.19E-05
Neptunium 237	4.25E-03	2.00E+00	1.68E+04	7.14E-05	3.96E-01	2.83E-05	3.43E-04	2.45E-08	5.66E-04	4.04E-08
Plutonium 239	1.24E-02	2.00E+00	1.68E+04	2.08E-04	9.28E-01	1.93E-04	2.88E-04	6.00E-08	9.10E-04	1.90E-07
Uranium 238	7.05E-01	2.00E+00	1.68E+04	1.18E-02	1.70E+02	2.01E+00	2.20E-05	2.61E-07	3.20E-05	3.79E-07
Uranium 235	5.72E-02	2.00E+00	1.68E+04	9.61E-04	1.70E+02	1.63E-01	2.30E-05	2.21E-08	3.40E-05	3.27E-08
Uranium 234	6.91E+00	2.00E+00	1.68E+04	1.16E-01	1.80E+02	2.09E+01	2.40E-05	2.79E-06	3.50E-05	4.06E-06
Thorium 232	3.58E-02	2.00E+00	1.68E+04	6.01E-04	8.53E+02	5.13E-01	5.80E-05	3.49E-08	5.80E-05	3.49E-08
Thorium 230	3.17E-02	2.00E+00	1.68E+04	5.33E-04	7.91E+02	4.21E-01	4.37E-05	2.33E-08	6.11E-05	3.25E-08
Technetium 99	4.47E+00	2.00E+00	1.68E+04	7.51E-02	2.40E+00	1.80E-01	7.60E-07	5.71E-08	7.60E-07	5.71E-08
Total						2.42E+01		3.00E-05		6.67E-05
						1.01E+00	mrem/yr			

WORKSHEET 7.89 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 2, Bedrock Wells

Scenario Timeframe: Future

Medium: Bedrock Groundwater

Exposure Medium: Groundwater

Exposure Route: Ingestion

Receptor: Industrial Worker

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Faxctor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Radium 226	1.66E+00	1.00E+00	6.25E+03	1.04E-02	1.03E+00	1.07E-02	9.58E-04	9.94E-06	2.22E-03	2.30E-05
Neptunium 237	4.25E-03	1.00E+00	6.25E+03	2.66E-05	3.96E-01	1.05E-05	3.43E-04	9.11E-09	5.66E-04	1.50E-08
Plutonium 239	1.24E-02	1.00E+00	6.25E+03	7.75E-05	9.28E-01	7.19E-05	2.88E-04	2.23E-08	9.10E-04	7.05E-08
Uranium 238	7.05E-01	1.00E+00	6.25E+03	4.41E-03	1.70E+02	7.49E-01	2.20E-05	9.69E-08	3.20E-05	1.41E-07
Uranium 235	5.72E-02	1.00E+00	6.25E+03	3.58E-04	1.70E+02	6.08E-02	2.30E-05	8.22E-09	3.40E-05	1.22E-08
Uranium 234	6.91E+00	1.00E+00	6.25E+03	4.32E-02	1.80E+02	7.77E+00	2.40E-05	1.04E-06	3.50E-05	1.51E-06
Thorium 232	3.58E-02	1.00E+00	6.25E+03	2.24E-04	8.53E+02	1.91E-01	5.80E-05	1.30E-08	5.80E-05	1.30E-08
Thorium 230	3.17E-02	1.00E+00	6.25E+03	1.98E-04	7.91E+02	1.57E-01	4.37E-05	8.66E-09	6.11E-05	1.21E-08
Technetium 99	4.47E+00	1.00E+00	6.25E+03	2.79E-02	2.40E+00	6.71E-02	7.60E-07	2.12E-08	7.60E-07	2.12E-08
Total						9.01E+00		1.12E-05		2.48E-05
						3.60E-01	mrem/yr			

WORKSHEET 7.90 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 3, Surface Water

Scenario Timeframe: Future

Exposure Medium: Surface water

Exposure Route: Ingestion

Receptor: Resident Child

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Uranium 238	2.21E+00	1.00E+00	2.10E+03	4.64E-03	3.00E+02	1.39E+00	1.50E-04	6.96E-07	2.50E-04	1.16E-06
Uranium 235	7.20E-02	1.00E+00	2.10E+03	1.51E-04	3.20E+02	4.84E-02	1.70E-04	2.57E-08	2.70E-04	4.08E-08
Thorium 232	1.87E-02	1.00E+00	2.10E+03	3.93E-05	1.30E+03	5.11E-02	2.20E-04	8.64E-09	3.30E-04	1.30E-08
Thorium 230	3.58E-02	1.00E+00	2.10E+03	7.52E-05	1.14E+03	8.57E-02	1.86E-04	1.40E-08	2.90E-04	2.18E-08
Technetium 99	1.63E+00	1.00E+00	2.10E+03	3.42E-03	8.50E+00	2.91E-02	7.60E-06	2.60E-08	1.30E-05	4.45E-08
Total						1.61E+00		7.70E-07		1.28E-06
						2.68E-01	mrem/yr			

WORKSHEET 7.91 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 3, Surface Water

Scenario Timeframe: Future

Exposure Medium: Surface water

Exposure Route: Ingestion

Receptor: Resident Adult

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Uranium 238	2.21E+00	2.00E+00	1.68E+04	3.71E-02	1.70E+02	6.31E+00	2.20E-05	8.17E-07	3.20E-05	1.19E-06
Uranium 235	7.20E-02	2.00E+00	1.68E+04	1.21E-03	1.70E+02	2.06E-01	2.30E-05	2.78E-08	3.40E-05	4.11E-08
Thorium 232	1.87E-02	2.00E+00	1.68E+04	3.14E-04	8.53E+02	2.68E-01	3.51E-04	1.10E-07	4.74E-04	1.49E-07
Thorium 230	3.58E-02	2.00E+00	1.68E+04	6.01E-04	7.91E+02	4.76E-01	4.37E-05	2.63E-08	6.11E-05	3.67E-08
Technetium 99	1.63E+00	2.00E+00	1.68E+04	2.74E-02	2.40E+00	6.57E-02	4.60E-07	1.26E-08	7.60E-07	2.08E-08
Total						7.33E+00		9.94E-07		1.44E-06
						3.05E-01	mrem/yr			

WORKSHEET 7.92 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 3, Surface Water

Scenario Timeframe: Future

Exposure Medium: Surface water

Exposure Route: Ingestion

Receptor: Construction worker

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Uranium 238	2.21E+00	1.00E+00	2.25E+02	4.97E-04	1.70E+02	8.45E-02	2.20E-05	1.09E-08	3.20E-05	1.59E-08
Uranium 235	7.20E-02	1.00E+00	2.25E+02	1.62E-05	1.70E+02	2.75E-03	2.30E-05	3.73E-10	3.40E-05	5.51E-10
Thorium 232	1.87E-02	1.00E+00	2.25E+02	4.21E-06	8.53E+02	3.59E-03	3.51E-04	1.48E-09	4.74E-04	1.99E-09
Thorium 230	3.58E-02	1.00E+00	2.25E+02	8.06E-06	7.91E+02	6.37E-03	4.37E-05	3.52E-10	6.11E-05	4.92E-10
Technetium 99	1.63E+00	1.00E+00	2.25E+02	3.67E-04	2.40E+00	8.80E-04	4.60E-07	1.69E-10	7.60E-07	2.79E-10
Total						9.81E-02		1.33E-08		1.92E-08
						9.81E-02	mrem/yr			

WORKSHEET 7.93 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 3, Surface Water
Scenario Timeframe: Future
Exposure Medium: Surface water
Exposure Route: Ingestion
Receptor: Industrial worker

Radiological Constituent of Concern	Groundwater Concentration pCi/l	Exposure Time (ET) liters/day	Total Uptake liters	Total Activity uCi	Dose Conversion Factor mrem/uCi	Radiation Dose mrem	Slope Factor Cancer /uCi	Cancer Risk unitless	Slope Factor NonCancer /uCi	Non Cancer Risk unitless
Uranium 238	2.21E+00	1.00E+00	6.25E+03	1.38E-02	1.70E+02	2.35E+00	2.20E-05	3.04E-07	3.20E-05	4.42E-07
Uranium 235	7.20E-02	1.00E+00	6.25E+03	4.50E-04	1.70E+02	7.65E-02	2.30E-05	1.04E-08	3.40E-05	1.53E-08
Thorium 232	1.87E-02	1.00E+00	6.25E+03	1.17E-04	8.53E+02	9.97E-02	3.51E-04	4.10E-08	4.74E-04	5.54E-08
Thorium 230	3.58E-02	1.00E+00	6.25E+03	2.24E-04	7.91E+02	1.77E-01	4.37E-05	9.78E-09	6.11E-05	1.37E-08
Technetium 99	1.63E+00	1.00E+00	6.25E+03	1.02E-02	2.40E+00	2.45E-02	4.60E-07	4.69E-09	7.60E-07	7.74E-09
Total						2.73E+00		3.70E-07		5.34E-07
						1.09E-01	mrem/yr			

WORKSHEET 7.94 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 3, Surface Water
Scenario Timeframe: Future
Exposure Medium: Surface water
Exposure Route: Ingestion
Receptor: Agricultural worker

Radiological Constituent of Concern	Groundwater Concentration	Exposure Time (ET)	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/l	liters/day	liters	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Uranium 238	2.21E+00	1.00E+00	6.75E+03	1.49E-02	1.70E+02	2.54E+00	2.20E-05	3.28E-07	3.20E-05	4.77E-07
Uranium 235	7.20E-02	1.00E+00	6.75E+03	4.86E-04	1.70E+02	8.26E-02	2.30E-05	1.12E-08	3.40E-05	1.65E-08
Thorium 232	1.87E-02	1.00E+00	6.75E+03	1.26E-04	8.53E+02	1.08E-01	3.51E-04	4.43E-08	4.74E-04	5.98E-08
Thorium 230	3.58E-02	1.00E+00	6.75E+03	2.42E-04	7.91E+02	1.91E-01	4.37E-05	1.06E-08	6.11E-05	1.48E-08
Technetium 99	1.63E+00	1.00E+00	6.75E+03	1.10E-02	2.40E+00	2.64E-02	4.60E-07	5.06E-09	7.60E-07	8.36E-09
Total						2.94E+00		3.99E-07		5.77E-07
						9.81E-02	mrem/yr			

WORKSHEET 7.95 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Resident Child

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	2.00E+02	4.20E+02	3.77E-04	2.28E+00	8.60E-04	9.58E-04	3.61E-07	2.22E-03	8.37E-07
Neptunium 237	1.66E+02	2.00E+02	4.20E+02	6.97E-02	5.28E-01	3.68E-02	3.43E-04	2.39E-05	5.66E-04	3.95E-05
Plutonium 239	1.37E-02	2.00E+02	4.20E+02	5.75E-06	1.23E+00	7.08E-06	2.88E-04	1.66E-09	9.10E-04	5.24E-09
Uranium 238	9.02E+01	2.00E+02	4.20E+02	3.79E-02	3.00E+02	1.14E+01	1.50E-04	5.68E-06	2.50E-04	9.47E-06
Uranium 235	3.20E+01	2.00E+02	4.20E+02	1.34E-02	3.20E+02	4.30E+00	1.70E-04	2.28E-06	2.70E-04	3.63E-06
Thorium 232	3.22E+00	2.00E+02	4.20E+02	1.35E-03	1.31E+03	1.77E+00	6.11E-03	8.26E-06	6.02E-03	8.14E-06
Technetium 99	8.34E+02	2.00E+02	4.20E+02	3.50E-01	8.50E+00	2.98E+00	7.60E-06	2.66E-06	1.30E-05	4.55E-06
Total						2.05E+01		4.32E-05		6.61E-05
						3.41E+00	mrem/yr			

WORKSHEET 7.96 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Resident Adult

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	1.00E+02	8.40E+02	7.54E-04	1.03E+00	7.77E-04	1.14E-04	8.60E-08	1.57E-04	1.18E-07
Neptunium 237	1.66E+02	1.00E+02	8.40E+02	1.39E-01	3.96E-01	5.52E-02	3.65E-05	5.09E-06	5.48E-05	7.64E-06
Plutonium 239	1.37E-02	1.00E+02	8.40E+02	1.15E-05	9.28E-01	1.07E-05	7.44E-05	8.56E-10	8.88E-05	1.02E-09
Uranium 238	9.02E+01	1.00E+02	8.40E+02	7.58E-02	1.70E+02	1.29E+01	2.20E-05	1.67E-06	3.20E-05	2.42E-06
Uranium 235	3.20E+01	1.00E+02	8.40E+02	2.69E-02	1.70E+02	4.57E+00	2.30E-05	6.18E-07	3.40E-05	9.14E-07
Thorium 232	3.22E+00	1.00E+02	8.40E+02	2.70E-03	8.53E+02	2.31E+00	3.51E-04	9.49E-07	4.74E-04	1.28E-06
Technetium 99	8.34E+02	1.00E+02	8.40E+02	7.01E-01	2.40E+00	1.68E+00	4.60E-07	3.22E-07	7.60E-07	5.32E-07
Total						2.15E+01		8.73E-06		1.29E-05
						8.96E-01	mrem/yr			

WORKSHEET 7.97 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Industrial Worker

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	1.00E+02	6.25E+02	5.61E-04	1.03E+00	5.78E-04	1.14E-04	6.40E-08	1.57E-04	8.81E-08
Neptunium 237	1.66E+02	1.00E+02	6.25E+02	1.04E-01	3.96E-01	4.11E-02	3.65E-05	3.79E-06	5.48E-05	5.69E-06
Plutonium 239	1.37E-02	1.00E+02	6.25E+02	8.56E-06	9.28E-01	7.95E-06	7.44E-05	6.37E-10	8.88E-05	7.60E-10
Uranium 238	9.02E+01	1.00E+02	6.25E+02	5.64E-02	1.70E+02	9.58E+00	2.20E-05	1.24E-06	3.20E-05	1.80E-06
Uranium 235	3.20E+01	1.00E+02	6.25E+02	2.00E-02	1.70E+02	3.40E+00	2.30E-05	4.60E-07	3.40E-05	6.80E-07
Thorium 232	3.22E+00	1.00E+02	6.25E+02	2.01E-03	8.53E+02	1.72E+00	3.51E-04	7.06E-07	4.74E-04	9.54E-07
Technetium 99	8.34E+02	1.00E+02	6.25E+02	5.21E-01	2.40E+00	1.25E+00	4.60E-07	2.40E-07	7.60E-07	3.96E-07
Total						1.60E+01		6.50E-06		9.61E-06
						6.40E-01	mrem/yr			

WORKSHEET 7.98 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Construction Worker

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	3.30E+02	7.43E+01	6.67E-05	1.03E+00	6.87E-05	1.14E-04	7.60E-09	1.57E-04	1.05E-08
Neptunium 237	1.66E+02	3.30E+02	7.43E+01	1.23E-02	3.96E-01	4.88E-03	3.65E-05	4.50E-07	5.48E-05	6.75E-07
Plutonium 239	1.37E-02	3.30E+02	7.43E+01	1.02E-06	9.28E-01	9.44E-07	7.44E-05	7.57E-11	8.88E-05	9.03E-11
Uranium 238	9.02E+01	3.30E+02	7.43E+01	6.70E-03	1.70E+02	1.14E+00	2.20E-05	1.47E-07	3.20E-05	2.14E-07
Uranium 235	3.20E+01	3.30E+02	7.43E+01	2.38E-03	1.70E+02	4.04E-01	2.30E-05	5.46E-08	3.40E-05	8.08E-08
Thorium 232	3.22E+00	3.30E+02	7.43E+01	2.39E-04	8.53E+02	2.04E-01	3.51E-04	8.39E-08	4.74E-04	1.13E-07
Technetium 99	8.34E+02	3.30E+02	7.43E+01	6.19E-02	2.40E+00	1.49E-01	4.60E-07	2.85E-08	7.60E-07	4.71E-08
Total						1.90E+00		7.72E-07		1.14E-06
						1.90E+00	mrem/yr			

WORKSHEET 7.99 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Recreational Child

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	2.00E+02	2.34E+02	2.10E-04	2.28E+00	4.79E-04	9.58E-04	2.01E-07	2.22E-03	4.66E-07
Neptunium 237	1.66E+02	2.00E+02	2.34E+02	3.88E-02	5.28E-01	2.05E-02	3.43E-04	1.33E-05	5.66E-04	2.20E-05
Plutonium 239	1.37E-02	2.00E+02	2.34E+02	3.21E-06	1.23E+00	3.94E-06	2.88E-04	9.23E-10	9.10E-04	2.92E-09
Uranium 238	9.02E+01	2.00E+02	2.34E+02	2.11E-02	3.00E+02	6.33E+00	1.50E-04	3.17E-06	2.50E-04	5.28E-06
Uranium 235	3.20E+01	2.00E+02	2.34E+02	7.49E-03	3.20E+02	2.40E+00	1.70E-04	1.27E-06	2.70E-04	2.02E-06
Thorium 232	3.22E+00	2.00E+02	2.34E+02	7.53E-04	1.31E+03	9.87E-01	6.11E-03	4.60E-06	6.02E-03	4.54E-06
Technetium 99	8.34E+02	2.00E+02	2.34E+02	1.95E-01	8.50E+00	1.66E+00	7.60E-06	1.48E-06	1.30E-05	2.54E-06
Total						1.14E+01		2.41E-05		3.68E-05
						1.90E+00	mrem/yr			

WORKSHEET 7.100 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Recreational Adult

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	1.00E+02	4.68E+02	4.20E-04	1.03E+00	4.33E-04	1.14E-04	4.79E-08	1.57E-04	6.60E-08
Neptunium 237	1.66E+02	1.00E+02	4.68E+02	7.77E-02	3.96E-01	3.08E-02	3.65E-05	2.84E-06	5.48E-05	4.26E-06
Plutonium 239	1.37E-02	1.00E+02	4.68E+02	6.41E-06	9.28E-01	5.95E-06	7.44E-05	4.77E-10	8.88E-05	5.69E-10
Uranium 238	9.02E+01	1.00E+02	4.68E+02	4.22E-02	1.70E+02	7.18E+00	2.20E-05	9.29E-07	3.20E-05	1.35E-06
Uranium 235	3.20E+01	1.00E+02	4.68E+02	1.50E-02	1.70E+02	2.55E+00	2.30E-05	3.44E-07	3.40E-05	5.09E-07
Thorium 232	3.22E+00	1.00E+02	4.68E+02	1.51E-03	8.53E+02	1.29E+00	3.51E-04	5.29E-07	4.74E-04	7.14E-07
Technetium 99	8.34E+02	1.00E+02	4.68E+02	3.90E-01	2.40E+00	9.37E-01	4.60E-07	1.80E-07	7.60E-07	2.97E-07
Total						1.20E+01		4.87E-06		7.19E-06
						4.99E-01	mrem/yr			

WORKSHEET 7.101 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Visitor/ Trespasser

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	1.00E+02	5.76E+01	5.17E-05	1.03E+00	5.33E-05	1.14E-04	5.90E-09	1.57E-04	8.12E-09
Neptunium 237	1.66E+02	1.00E+02	5.76E+01	9.56E-03	3.96E-01	3.79E-03	3.65E-05	3.49E-07	5.48E-05	5.24E-07
Plutonium 239	1.37E-02	1.00E+02	5.76E+01	7.89E-07	9.28E-01	7.32E-07	7.44E-05	5.87E-11	8.88E-05	7.01E-11
Uranium 238	9.02E+01	1.00E+02	5.76E+01	5.20E-03	1.70E+02	8.83E-01	2.20E-05	1.14E-07	3.20E-05	1.66E-07
Uranium 235	3.20E+01	1.00E+02	5.76E+01	1.84E-03	1.70E+02	3.13E-01	2.30E-05	4.24E-08	3.40E-05	6.27E-08
Thorium 232	3.22E+00	1.00E+02	5.76E+01	1.85E-04	8.53E+02	1.58E-01	3.51E-04	6.51E-08	4.74E-04	8.79E-08
Technetium 99	8.34E+02	1.00E+02	5.76E+01	4.80E-02	2.40E+00	1.15E-01	4.60E-07	2.21E-08	7.60E-07	3.65E-08
Total						1.47E+00		5.99E-07		8.86E-07
						6.14E-02	mrem/yr			

WORKSHEET 7.102 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 4, Surface Soil

Scenario Timeframe: Future

Exposure Medium: Surface Soil

Exposure Route: Ingestion

Receptor: Agricultural Worker

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	8.98E-01	2.00E+02	1.35E+03	1.21E-03	1.03E+00	1.25E-03	1.14E-04	1.38E-07	1.57E-04	1.90E-07
Neptunium 237	1.66E+02	2.00E+02	1.35E+03	2.24E-01	3.96E-01	8.87E-02	3.65E-05	8.18E-06	5.48E-05	1.23E-05
Plutonium 239	1.37E-02	2.00E+02	1.35E+03	1.85E-05	9.28E-01	1.72E-05	7.44E-05	1.38E-09	8.88E-05	1.64E-09
Uranium 238	9.02E+01	2.00E+02	1.35E+03	1.22E-01	1.70E+02	2.07E+01	2.20E-05	2.68E-06	3.20E-05	3.90E-06
Uranium 235	3.20E+01	2.00E+02	1.35E+03	4.32E-02	1.70E+02	7.34E+00	2.30E-05	9.94E-07	3.40E-05	1.47E-06
Thorium 232	3.22E+00	2.00E+02	1.35E+03	4.35E-03	8.53E+02	3.71E+00	3.51E-04	1.53E-06	4.74E-04	2.06E-06
Technetium 99	8.34E+02	2.00E+02	1.35E+03	1.13E+00	2.40E+00	2.70E+00	4.60E-07	5.18E-07	7.60E-07	8.56E-07
Total						3.45E+01		1.40E-05		2.08E-05
						1.15E+00	mrem/yr			

WORKSHEET 7.103 CALCULATION OF RISK

Westinghouse Electric Co. Hematite Site

EPC Set 6, Subsurface Soil

Scenario Timeframe: Future

Exposure Medium: Subsurface Soil

Exposure Route: Ingestion

Receptor: Construction Worker

Radiological Constituent of Concern	Soil Concentration	Intake Rate	Total Uptake	Total Activity	Dose Conversion Factor	Radiation Dose	Slope Factor Cancer	Cancer Risk	Slope Factor NonCancer	Non Cancer Risk
	pCi/g	mg/day	grams	uCi	mrem/uCi	mrem	/uCi	unitless	/uCi	unitless
Radium 226	7.93E-01	3.30E+02	7.43E+01	5.89E-05	1.03E+00	6.06E-05	1.14E-04	6.71E-09	1.57E-04	9.24E-09
Neptunium 237	1.00E-04	3.30E+02	7.43E+01	7.43E-09	3.96E-01	2.94E-09	3.65E-05	2.71E-13	5.48E-05	4.07E-13
Plutonium 239	3.73E-03	3.30E+02	7.43E+01	2.77E-07	9.28E-01	2.57E-07	7.44E-05	2.06E-11	8.88E-05	2.46E-11
Uranium 238	3.29E+00	3.30E+02	7.43E+01	2.44E-04	1.70E+02	4.15E-02	2.20E-05	5.37E-09	3.20E-05	7.82E-09
Uranium 234	4.88E+02	3.30E+02	7.43E+01	3.62E-02	1.80E+02	6.52E+00	2.40E-05	8.70E-07	3.50E-05	1.27E-06
Uranium 235	1.35E+00	3.30E+02	7.43E+01	1.00E-04	1.70E+02	1.70E-02	2.30E-05	2.31E-09	3.40E-05	3.41E-09
Thorium 232	1.02E+00	3.30E+02	7.43E+01	7.57E-05	8.53E+02	6.46E-02	3.51E-04	2.66E-08	4.74E-04	3.59E-08
Thorium 230	1.22E+00	3.30E+02	7.43E+01	9.06E-05	7.91E+02	7.17E-02	4.37E-05	3.96E-09	6.11E-05	5.53E-09
Technetium 99	2.31E+00	3.30E+02	7.43E+01	1.72E-04	2.40E+00	4.12E-04	4.60E-07	7.89E-11	7.60E-07	1.30E-10
Total						6.72E+00		9.15E-07		1.33E-06
						6.72E+00	mrem/yr			

Appendix E - IEUBK Output

LEAD MODEL FOR WINDOWS Version 1.0

==========
==========

Model Version: 1.0 Build 261
User Name: PT
Date: 8/30/2005
Site Name: Hematite Site
Operable Unit: 1
Run Mode: Site Risk Assessment

Soil/Dust Data
Run the Model
None
Water Data
Drinking Water Concentration
Soil/Dust Data
Surface Soil Concentration
Run the Model
Concentrations

==========
==========

The time step used in this model run: 2 - Daily (once a day).

****** Air ******

Indoor Air Pb Concentration: 30.000 percent of outdoor.
Other Air Parameters:

Age	Time Outdoors (hours)	Ventilation Rate (m^3/day)	Lung Absorption (%)	Outdoor Air Pb Conc (ug Pb/m^3)
.5-1	1.000	2.000	32.000	0.100
1-2	2.000	3.000	32.000	0.100
2-3	3.000	5.000	32.000	0.100
3-4	4.000	5.000	32.000	0.100
4-5	4.000	5.000	32.000	0.100
5-6	4.000	7.000	32.000	0.100
6-7	4.000	7.000	32.000	0.100

****** Diet ******

Age	Diet Intake(ug/day)
.5-1	5.530
1-2	5.780
2-3	6.490
3-4	6.240
4-5	6.010
5-6	6.340
6-7	7.000

****** Drinking Water ******

Water Consumption:

Age	Water (L/day)
.5-1	0.200
1-2	0.500
2-3	0.520
3-4	0.530
4-5	0.550
5-6	0.580
6-7	0.590

Drinking Water Concentration: 8.000 ug Pb/L

****** Soil & Dust ******

Multiple Source Analysis Used
Average multiple source concentration: 123.400 ug/g

Mass fraction of outdoor soil to indoor dust conversion factor: 0.700
Outdoor airborne lead to indoor household dust lead concentration: 100.000
Use alternate indoor dust Pb sources? No

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
.5-1	162.000	123.400
1-2	162.000	123.400
2-3	162.000	123.400
3-4	162.000	123.400
4-5	162.000	123.400
5-6	162.000	123.400
6-7	162.000	123.400

****** Alternate Intake ******

Age	Alternate (ug Pb/day)
.5-1	0.000
1-2	0.000
2-3	0.000
3-4	0.000
4-5	0.000
5-6	0.000
6-7	0.000

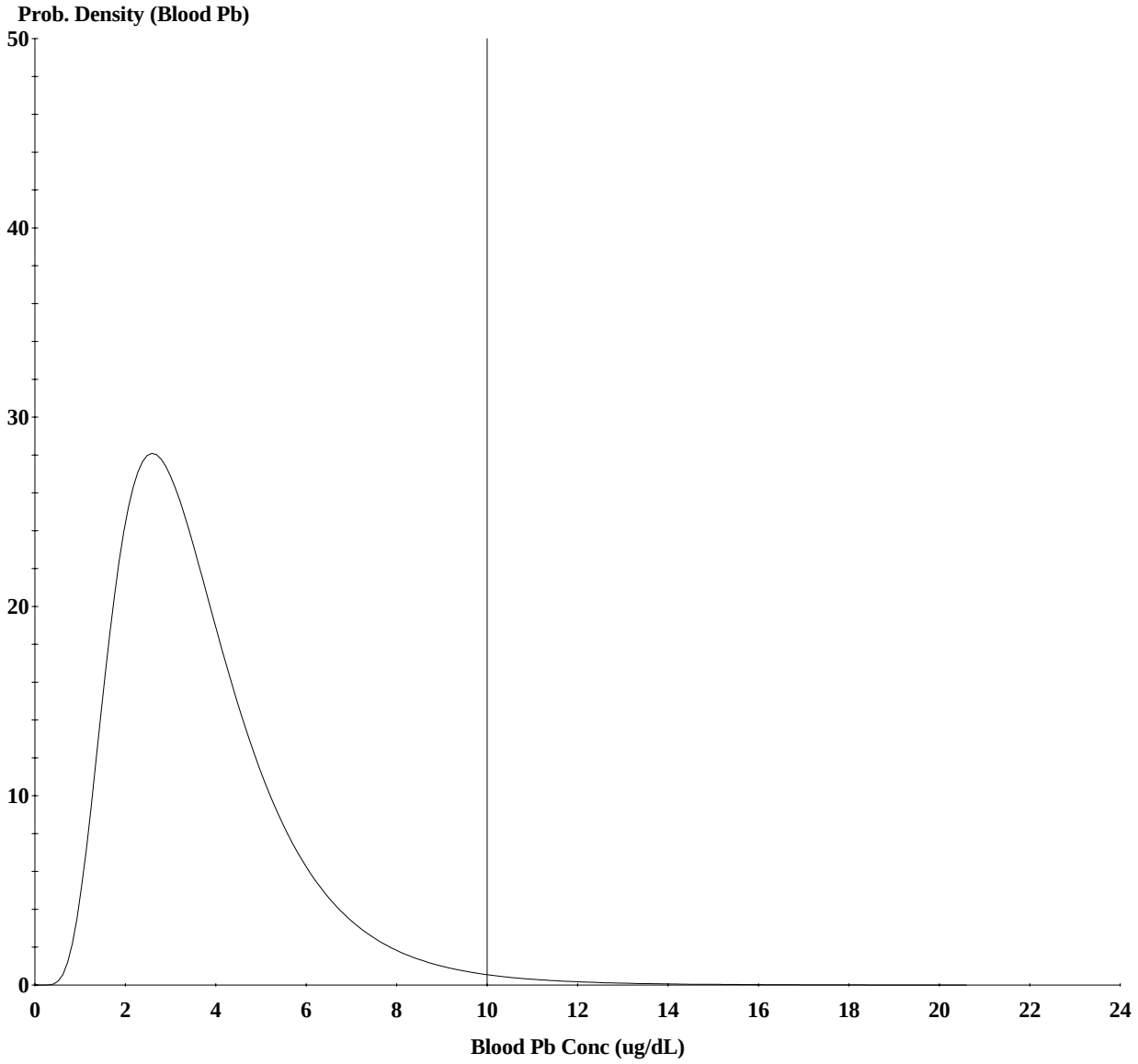
****** Maternal Contribution: Infant Model ******

Maternal Blood Concentration: 2.500 ug Pb/dL

****
CALCULATED BLOOD LEAD AND LEAD UPTAKES:
****

Year	Air (ug/day)	Diet (ug/day)	Alternate (ug/day)	Water (ug/day)
.5-1	0.021	2.563	0.000	0.742
1-2	0.034	2.653	0.000	1.836
2-3	0.062	3.006	0.000	1.927
3-4	0.067	2.923	0.000	1.986
4-5	0.067	2.861	0.000	2.094
5-6	0.093	3.036	0.000	2.222
6-7	0.093	3.361	0.000	2.266

Year	Soil+Dust (ug/day)	Total (ug/day)	Blood (ug/dL)
.5-1	3.328	6.654	3.6
1-2	5.233	9.756	4.0
2-3	5.282	10.278	3.8
3-4	5.341	10.316	3.6
4-5	4.020	9.042	3.1
5-6	3.640	8.991	2.8
6-7	3.447	9.169	2.6



Cutoff = 10.000 ug/dl
Geo Mean = 3.370
GSD = 1.600
% Above = 1.032
% Below = 98.968

Age Range = 0 to 84 months
Time Step = Daily
Run Mode = Site Risk Assessment

Appendix F - RESRAD Output

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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(3)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(4)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(5)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(6)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(7)
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(8)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(9)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(10)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(11)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(12)
B-1	U-233	1.350E-01	1.350E-01	DCF2(13)
B-1	U-234	1.320E-01	1.320E-01	DCF2(14)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(15)
B-1	U-238	1.180E-01	1.180E-01	DCF2(16)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(17)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(2)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(3)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(4)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(5)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(6)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(7)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(8)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(9)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(10)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(11)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(12)
D-1	U-233	2.890E-04	2.890E-04	DCF3(13)
D-1	U-234	2.830E-04	2.830E-04	DCF3(14)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(15)
D-1	U-238	2.550E-04	2.550E-04	DCF3(16)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(17)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

0 Menu	Parameter		Current Value	Base Case*	Parameter Name
D-34	Pb-210+D	, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pb-210+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(4,2)
D-34	Pb-210+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(4,3)
D-34					
D-34	Pu-239	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Pu-239	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Pu-239	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(5,3)
D-34					
D-34	Ra-226+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-226+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-226+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34					
D-34	Ra-228+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(7,1)
D-34	Ra-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,2)
D-34	Ra-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,3)
D-34					
D-34	Tc-99	, plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(8,1)
D-34	Tc-99	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Tc-99	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34					
D-34	Th-228+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34					
D-34	Th-229+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-229+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-229+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34					
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(11,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(11,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(12,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(12,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34					
D-34	U-233	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-233	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-233	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(15,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(15,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(15,3)
D-34					
D-34	U-238	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(16,1)
D-34	U-238	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(16,2)
D-34	U-238	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(16,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(17,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(17,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(17,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(3,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(3,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(4,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(7,2)
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(8,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(8,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(11,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(12,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(15,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(16,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(16,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(17,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(17,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	7.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	not used	3.000E+02	---	T(7)
R011	Times for calculations (yr)	not used	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Np-237	1.660E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.370E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.980E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.220E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.340E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-228	3.220E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Th-232	3.220E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	3.200E+01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): U-238	9.020E+01	0.000E+00	---	S1(16)
R012	Concentration in groundwater (pCi/L): Np-237	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(16)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.625E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.111E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.039E+01	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.099E-01	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.217E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R017	Inhalation rate (m**3/yr)	2.250E+02	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	2.400E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed
Find peak pathway doses	active

```
      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:  10000.00 square meters                Np-237     1.660E+02
   Thickness:      0.15 meters                       Pu-239     1.370E-01
 Cover Depth:      0.00 meters                       Ra-226     8.980E-01
                                                     Ra-228     3.220E+00
                                                     Tc-99      8.340E+02
                                                     Th-228     3.220E+00
                                                     Th-232     3.220E+00
                                                     U-235      3.200E+01
                                                     U-238      9.020E+01
0
                         Total Dose TDOSE(t), mrem/yr
                    Basic Radiation Dose Limit = 2.500E+01 mrem/yr
   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  7.000E+01
     TDOSE(t):  5.004E+00  4.921E+00  4.758E+00  4.260E+00  3.297E+00  2.069E+00
         M(t):  2.002E-01  1.968E-01  1.903E-01  1.704E-01  1.319E-01  8.274E-02
0Maximum TDOSE(t):  5.004E+00 mrem/yr   at t = 0.000E+00 years
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.323E+00	0.6641	6.777E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	7.594E-07	0.0000	4.460E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.625E-01	0.0325	6.006E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	3.783E-01	0.0756	1.406E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	1.952E-04	0.0000	5.091E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	4.319E-01	0.0863	7.085E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.184E-02	0.0044	4.016E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.435E-01	0.0886	2.924E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.343E-01	0.0468	7.908E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.996E+00	0.9983	8.352E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.330E+00	0.6655
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.220E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.625E-01	0.0325
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.783E-01	0.0756
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.952E-04	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.320E-01	0.0863
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.224E-02	0.0044
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.438E-01	0.0887
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.351E-01	0.0470
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.004E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ
Np-237	3.291E+00	0.6688	6.674E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	7.580E-07	0.0000	4.425E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.570E-01	0.0319	6.233E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.451E-01	0.0904	3.174E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	6.018E-09	0.0000	1.559E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.999E-01	0.0609	4.898E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	7.195E-02	0.0146	4.017E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.240E-01	0.0862	2.779E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.238E-01	0.0455	7.515E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	4.913E+00	0.9983	8.191E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ		ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄ
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.298E+00	0.6701
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.183E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.570E-01	0.0319
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.451E-01	0.0905
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.020E-09	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.999E-01	0.0610
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.235E-02	0.0147
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.243E-01	0.0862
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.246E-01	0.0456
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.921E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.227E+00	0.6784	6.472E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	7.551E-07	0.0000	4.356E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.466E-01	0.0308	6.584E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.570E-01	0.0961	4.418E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	5.721E-18	0.0000	1.463E-21	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.446E-01	0.0304	2.341E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.824E-01	0.0383	4.058E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	3.874E-01	0.0814	2.511E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.042E-01	0.0429	6.786E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.750E+00	0.9983	7.880E-03	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.234E+00	0.6797
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.111E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.466E-01	0.0308
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.571E-01	0.0961
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.723E-18	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.446E-01	0.0304
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.828E-01	0.0384
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.877E-01	0.0815
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.049E-01	0.0431
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.758E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.012E+00	0.7070	5.801E-03	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	7.447E-07	0.0000	4.115E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.152E-01	0.0270	6.987E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.197E-01	0.0516	2.470E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.123E-02	0.0026	1.764E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	4.645E-01	0.1090	4.164E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	2.825E-01	0.0663	1.759E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.480E-01	0.0348	4.740E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.253E+00	0.9984	6.899E-03	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.018E+00	0.7084
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.859E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.152E-01	0.0270
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.198E-01	0.0516
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.123E-02	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.649E-01	0.1091
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.826E-01	0.0663
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.485E-01	0.0349
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.260E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	2.451E+00	0.7435	4.182E-03	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	7.111E-07	0.0000	3.445E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.726E-02	0.0174	5.079E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.070E-02	0.0032	1.130E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	7.509E-06	0.0000	1.077E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.008E-01	0.1822	3.734E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.137E-01	0.0345	6.285E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	5.854E-02	0.0178	1.676E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	3.292E+00	0.9985	4.791E-03	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.456E+00	0.7448
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.156E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.726E-02	0.0174
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.071E-02	0.0032
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.510E-06	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.012E-01	0.1823
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-01	0.0345
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.870E-02	0.0178
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.297E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.525E+00	0.7372	1.970E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	6.168E-07	0.0000	2.190E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.316E-02	0.0064	1.322E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.005E-05	0.0000	1.710E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	3.125E-12	0.0000	3.634E-16	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	5.023E-01	0.2428	2.487E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.737E-02	0.0084	7.287E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	8.593E-03	0.0042	1.899E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	2.066E+00	0.9989	2.248E-03	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.527E+00	0.7381
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.807E-06	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.316E-02	0.0064
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.005E-05	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.125E-12	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.025E-01	0.2429
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.738E-02	0.0084
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.612E-03	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.069E+00	1.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
Np-237+D	Np-237+D	1.000E+00	2.006E-02	1.987E-02	1.948E-02	1.818E-02	1.479E-02	9.198E-03
Np-237+D	U-233	1.000E+00	7.827E-11	2.289E-10	5.048E-10	1.243E-09	2.097E-09	1.736E-09
Np-237+D	Th-229+D	1.000E+00	1.947E-12	1.341E-11	6.834E-11	5.373E-10	3.172E-09	8.527E-09
Np-237+D	äDSR(j)		2.006E-02	1.987E-02	1.948E-02	1.818E-02	1.479E-02	9.198E-03
0Pu-239	Pu-239	1.000E+00	3.810E-05	3.783E-05	3.731E-05	3.547E-05	3.034E-05	2.049E-05
Pu-239	U-235+D	1.000E+00	6.876E-12	2.021E-11	4.505E-11	1.155E-10	2.211E-10	2.465E-10
Pu-239	Pa-231	1.000E+00	1.210E-17	8.246E-17	4.104E-16	2.964E-15	1.383E-14	2.437E-14
Pu-239	Ac-227+D	1.000E+00	9.785E-19	1.396E-17	1.458E-16	2.625E-15	2.351E-14	5.405E-14
Pu-239	äDSR(j)		3.810E-05	3.783E-05	3.731E-05	3.547E-05	3.034E-05	2.049E-05
0Ra-226+D	Ra-226+D	1.000E+00	1.809E-01	1.748E-01	1.633E-01	1.283E-01	6.373E-02	1.464E-02
Ra-226+D	Pb-210+D	1.000E+00	1.783E-06	5.147E-06	1.103E-05	2.450E-05	3.026E-05	1.280E-05
Ra-226+D	äDSR(j)		1.809E-01	1.749E-01	1.633E-01	1.283E-01	6.376E-02	1.465E-02
0Ra-228+D	Ra-228+D	1.000E+00	9.302E-02	7.972E-02	5.856E-02	1.987E-02	8.960E-04	1.697E-06
Ra-228+D	Th-228+D	1.000E+00	2.446E-02	5.851E-02	8.339E-02	4.838E-02	2.429E-03	4.530E-06
Ra-228+D	äDSR(j)		1.175E-01	1.382E-01	1.419E-01	6.825E-02	3.325E-03	6.227E-06
0Tc-99	Tc-99	1.000E+00	2.341E-07	7.218E-12	6.862E-21	0.000E+00	0.000E+00	0.000E+00
0Th-228+D	Th-228+D	1.000E+00	1.342E-01	9.315E-02	4.490E-02	3.489E-03	2.332E-06	9.706E-13
0Th-232	Th-232	1.000E+00	1.346E-04	1.338E-04	1.321E-04	1.262E-04	1.094E-04	7.557E-05
Th-232	Ra-228+D	1.000E+00	5.747E-03	1.612E-02	3.255E-02	6.196E-02	7.278E-02	6.120E-02
Th-232	Th-228+D	1.000E+00	1.025E-03	6.220E-03	2.410E-02	8.230E-02	1.138E-01	9.478E-02
Th-232	äDSR(j)		6.906E-03	2.247E-02	5.678E-02	1.444E-01	1.867E-01	1.561E-01
0U-235+D	U-235+D	1.000E+00	1.387E-02	1.326E-02	1.211E-02	8.831E-03	3.553E-03	5.424E-04
U-235+D	Pa-231	1.000E+00	3.660E-08	1.054E-07	2.248E-07	4.899E-07	5.646E-07	1.923E-07
U-235+D	Ac-227+D	1.000E+00	3.930E-09	2.575E-08	1.173E-07	6.235E-07	1.311E-06	5.642E-07
U-235+D	äDSR(j)		1.387E-02	1.326E-02	1.212E-02	8.832E-03	3.555E-03	5.432E-04
0U-238	U-238	5.400E-05	5.813E-10	5.531E-10	5.007E-10	3.531E-10	1.289E-10	1.623E-11
0U-238+D	U-238+D	9.999E-01	2.606E-03	2.490E-03	2.272E-03	1.646E-03	6.508E-04	9.547E-05
U-238+D	U-234	9.999E-01	2.447E-11	7.033E-11	1.493E-10	3.198E-10	3.521E-10	1.118E-10
U-238+D	Th-230	9.999E-01	1.992E-16	1.356E-15	6.723E-15	4.798E-14	2.170E-13	3.692E-13
U-238+D	Ra-226+D	9.999E-01	8.262E-17	1.206E-15	1.322E-14	2.806E-13	3.648E-12	1.298E-11
U-238+D	Pb-210+D	9.999E-01	3.283E-22	9.873E-21	2.326E-19	1.426E-17	5.089E-16	3.870E-15
U-238+D	äDSR(j)		2.606E-03	2.490E-03	2.272E-03	1.646E-03	6.508E-04	9.548E-05

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide

(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
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Np-237	1.246E+03	1.258E+03	1.283E+03	1.375E+03	1.690E+03	2.718E+03
Pu-239	6.562E+05	6.608E+05	6.701E+05	7.048E+05	8.240E+05	1.220E+06
Ra-226	1.382E+02	1.430E+02	1.531E+02	1.949E+02	3.921E+02	1.706E+03
Ra-228	2.128E+02	1.808E+02	1.761E+02	3.663E+02	7.520E+03	4.015E+06
Tc-99	1.068E+08	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10
Th-228	1.864E+02	2.684E+02	5.568E+02	7.166E+03	1.072E+07	2.576E+13
Th-232	3.620E+03	1.113E+03	4.403E+02	1.731E+02	1.339E+02	1.602E+02
U-235	1.803E+03	1.886E+03	2.064E+03	2.831E+03	7.033E+03	4.603E+04
U-238	9.592E+03	1.004E+04	1.101E+04	1.518E+04	3.841E+04	2.618E+05
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*At specific activity limit

0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide

(i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	1.660E+02	0.000E+00	2.006E-02	1.246E+03	2.006E-02	1.246E+03
Pu-239	1.370E-01	0.000E+00	3.810E-05	6.562E+05	3.810E-05	6.562E+05
Ra-226	8.980E-01	0.000E+00	1.809E-01	1.382E+02	1.809E-01	1.382E+02
Ra-228	3.220E+00	2.130 ñ 0.004	1.446E-01	1.729E+02	1.175E-01	2.128E+02
Tc-99	8.340E+02	0.000E+00	2.341E-07	1.068E+08	2.341E-07	1.068E+08
Th-228	3.220E+00	0.000E+00	1.342E-01	1.864E+02	1.342E-01	1.864E+02
Th-232	3.220E+00	27.11 ñ 0.05	1.871E-01	1.336E+02	6.906E-03	3.620E+03
U-235	3.200E+01	0.000E+00	1.387E-02	1.803E+03	1.387E-02	1.803E+03
U-238	9.020E+01	0.000E+00	2.606E-03	9.592E+03	2.606E-03	9.592E+03
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	3.330E+00	3.298E+00	3.234E+00	3.018E+00	2.456E+00	1.527E+00
0U-233	Np-237	1.000E+00	1.299E-08	3.800E-08	8.380E-08	2.064E-07	3.481E-07	2.882E-07
0Th-229	Np-237	1.000E+00	3.232E-10	2.226E-09	1.135E-08	8.919E-08	5.266E-07	1.415E-06
0Pu-239	Pu-239	1.000E+00	5.220E-06	5.183E-06	5.111E-06	4.859E-06	4.156E-06	2.807E-06
0U-235	Pu-239	1.000E+00	9.420E-13	2.768E-12	6.172E-12	1.582E-11	3.029E-11	3.377E-11
U-235	U-235	1.000E+00	4.438E-01	4.242E-01	3.877E-01	2.826E-01	1.137E-01	1.736E-02
U-235	äDOSE(j)		4.438E-01	4.242E-01	3.877E-01	2.826E-01	1.137E-01	1.736E-02
0Pa-231	Pu-239	1.000E+00	1.657E-18	1.130E-17	5.622E-17	4.061E-16	1.894E-15	3.338E-15
Pa-231	U-235	1.000E+00	1.171E-06	3.374E-06	7.195E-06	1.568E-05	1.807E-05	6.153E-06
Pa-231	äDOSE(j)		1.171E-06	3.374E-06	7.195E-06	1.568E-05	1.807E-05	6.153E-06
0Ac-227	Pu-239	1.000E+00	1.340E-19	1.913E-18	1.998E-17	3.596E-16	3.221E-15	7.405E-15
Ac-227	U-235	1.000E+00	1.258E-07	8.239E-07	3.752E-06	1.995E-05	4.195E-05	1.806E-05
Ac-227	äDOSE(j)		1.258E-07	8.239E-07	3.752E-06	1.995E-05	4.195E-05	1.806E-05
0Ra-226	Ra-226	1.000E+00	1.625E-01	1.570E-01	1.466E-01	1.152E-01	5.723E-02	1.315E-02
Ra-226	U-238	9.999E-01	7.452E-15	1.088E-13	1.193E-12	2.531E-11	3.291E-10	1.171E-09
Ra-226	äDOSE(j)		1.625E-01	1.570E-01	1.466E-01	1.152E-01	5.723E-02	1.315E-02
0Pb-210	Ra-226	1.000E+00	1.601E-06	4.622E-06	9.907E-06	2.200E-05	2.718E-05	1.149E-05
Pb-210	U-238	9.999E-01	2.961E-20	8.905E-19	2.098E-17	1.287E-15	4.590E-14	3.491E-13
Pb-210	äDOSE(j)		1.601E-06	4.622E-06	9.907E-06	2.200E-05	2.718E-05	1.149E-05
0Ra-228	Ra-228	1.000E+00	2.995E-01	2.567E-01	1.886E-01	6.397E-02	2.885E-03	5.463E-06
Ra-228	Th-232	1.000E+00	1.850E-02	5.189E-02	1.048E-01	1.995E-01	2.344E-01	1.971E-01
Ra-228	äDOSE(j)		3.180E-01	3.086E-01	2.934E-01	2.635E-01	2.372E-01	1.971E-01
0Th-228	Ra-228	1.000E+00	7.877E-02	1.884E-01	2.685E-01	1.558E-01	7.820E-03	1.459E-05
Th-228	Th-228	1.000E+00	4.320E-01	2.999E-01	1.446E-01	1.123E-02	7.510E-06	3.125E-12
Th-228	Th-232	1.000E+00	3.301E-03	2.003E-02	7.760E-02	2.650E-01	3.664E-01	3.052E-01
Th-228	äDOSE(j)		5.140E-01	5.084E-01	4.907E-01	4.320E-01	3.743E-01	3.052E-01
0Tc-99	Tc-99	1.000E+00	1.952E-04	6.020E-09	5.723E-18	0.000E+00	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	4.334E-04	4.307E-04	4.253E-04	4.064E-04	3.523E-04	2.433E-04
0U-238	U-238	5.400E-05	5.243E-08	4.989E-08	4.516E-08	3.185E-08	1.163E-08	1.464E-09
U-238	U-238	9.999E-01	2.351E-01	2.246E-01	2.049E-01	1.485E-01	5.870E-02	8.612E-03
U-238	äDOSE(j)		2.351E-01	2.246E-01	2.049E-01	1.485E-01	5.870E-02	8.612E-03
0U-234	U-238	9.999E-01	2.207E-09	6.344E-09	1.347E-08	2.885E-08	3.176E-08	1.009E-08
0Th-230	U-238	9.999E-01	1.797E-14	1.223E-13	6.064E-13	4.328E-12	1.958E-11	3.330E-11
ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.660E+02	1.646E+02	1.618E+02	1.523E+02	1.282E+02	9.076E+01
0U-233	Np-237	1.000E+00	0.000E+00	7.070E-04	2.013E-03	5.602E-03	1.033E-02	1.022E-02
0Th-229	Np-237	1.000E+00	0.000E+00	3.368E-08	2.927E-07	2.885E-06	1.888E-05	5.936E-05
0Pu-239	Pu-239	1.000E+00	1.370E-01	1.368E-01	1.365E-01	1.354E-01	1.324E-01	1.265E-01
0U-235	Pu-239	1.000E+00	0.000E+00	1.319E-10	3.784E-10	1.084E-09	2.195E-09	2.748E-09
U-235	U-235	1.000E+00	3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
U-235	äS(j):		3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.385E-15	1.175E-14	1.064E-13	5.503E-13	1.139E-12
Pa-231	U-235	1.000E+00	0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
Pa-231	äS(j):		0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
0Ac-227	Pu-239	1.000E+00	0.000E+00	1.430E-17	3.446E-16	8.712E-15	8.892E-14	2.400E-13
Ac-227	U-235	1.000E+00	0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
Ac-227	äS(j):		0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
0Ra-226	Ra-226	1.000E+00	8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
Ra-226	U-238	9.999E-01	0.000E+00	1.613E-13	4.100E-12	1.233E-10	1.873E-09	8.260E-09
Ra-226	äS(j):		8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
0Pb-210	Ra-226	1.000E+00	0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
Pb-210	U-238	9.999E-01	0.000E+00	1.247E-15	9.427E-14	9.148E-12	3.788E-10	3.191E-09
Pb-210	äS(j):		0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
0Ra-228	Ra-228	1.000E+00	3.220E+00	2.765E+00	2.040E+00	7.029E-01	3.349E-02	7.603E-05
Ra-228	Th-232	1.000E+00	0.000E+00	3.601E-01	9.348E-01	1.993E+00	2.522E+00	2.544E+00
Ra-228	äS(j):		3.220E+00	3.125E+00	2.974E+00	2.696E+00	2.555E+00	2.544E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	9.037E-01	1.645E+00	1.064E+00	5.763E-02	1.311E-04
Th-228	Th-228	1.000E+00	3.220E+00	2.241E+00	1.086E+00	8.594E-02	6.121E-05	3.105E-11
Th-228	Th-232	1.000E+00	0.000E+00	5.940E-02	3.877E-01	1.639E+00	2.502E+00	2.544E+00
Th-228	äS(j):		3.220E+00	3.204E+00	3.118E+00	2.789E+00	2.560E+00	2.544E+00
0Tc-99	Tc-99	1.000E+00	8.340E+02	2.572E-02	2.445E-11	1.169E-42	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	3.220E+00	3.220E+00	3.220E+00	3.219E+00	3.216E+00	3.212E+00
0U-238	U-238	5.400E-05	4.871E-03	4.660E-03	4.265E-03	3.129E-03	1.291E-03	2.199E-04
U-238	U-238	9.999E-01	9.020E+01	8.629E+01	7.898E+01	5.794E+01	2.391E+01	4.072E+00
U-238	äS(j):		9.020E+01	8.630E+01	7.899E+01	5.794E+01	2.391E+01	4.072E+00
0U-234	U-238	9.999E-01	0.000E+00	2.446E-04	6.717E-04	1.643E-03	2.033E-03	8.080E-04
0Th-230	U-238	9.999E-01	0.000E+00	1.117E-09	9.485E-09	8.615E-08	4.498E-07	9.562E-07
ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 25.69 seconds

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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(3)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(4)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(5)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(6)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(7)
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(8)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(9)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(10)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(11)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(12)
B-1	U-233	1.350E-01	1.350E-01	DCF2(13)
B-1	U-234	1.320E-01	1.320E-01	DCF2(14)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(15)
B-1	U-238	1.180E-01	1.180E-01	DCF2(16)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(17)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(2)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(3)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(4)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(5)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(6)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(7)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(8)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(9)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(10)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(11)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(12)
D-1	U-233	2.890E-04	2.890E-04	DCF3(13)
D-1	U-234	2.830E-04	2.830E-04	DCF3(14)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(15)
D-1	U-238	2.550E-04	2.550E-04	DCF3(16)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(17)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter		Current Value	Base Case*	Parameter Name
D-34	Pb-210+D	, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pb-210+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(4,2)
D-34	Pb-210+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(4,3)
D-34					
D-34	Pu-239	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Pu-239	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Pu-239	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(5,3)
D-34					
D-34	Ra-226+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-226+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-226+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34					
D-34	Ra-228+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(7,1)
D-34	Ra-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,2)
D-34	Ra-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,3)
D-34					
D-34	Tc-99	, plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(8,1)
D-34	Tc-99	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Tc-99	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34					
D-34	Th-228+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34					
D-34	Th-229+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-229+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-229+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34					
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(11,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(11,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(12,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(12,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34					
D-34	U-233	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-233	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-233	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(15,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(15,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(15,3)
D-34					
D-34	U-238	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(16,1)
D-34	U-238	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(16,2)
D-34	U-238	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(16,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(17,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(17,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(17,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(3,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(3,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(4,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(7,2)
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(8,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(8,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(11,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(12,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(15,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(16,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(16,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(17,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(17,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	7.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	not used	3.000E+02	---	T(7)
R011	Times for calculations (yr)	not used	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Np-237	1.660E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.370E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.980E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.220E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.340E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-228	3.220E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Th-232	3.220E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	3.200E+01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): U-238	9.020E+01	0.000E+00	---	S1(16)
R012	Concentration in groundwater (pCi/L): Np-237	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(16)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.625E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.111E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.039E+01	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.099E-01	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.217E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R017	Inhalation rate (m**3/yr)	3.045E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	6.000E+00	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	7.400E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.200E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed
Find peak pathway doses	active

```
      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:  10000.00 square meters                Np-237     1.660E+02
   Thickness:      0.15 meters                       Pu-239     1.370E-01
 Cover Depth:      0.00 meters                       Ra-226     8.980E-01
                                                     Ra-228     3.220E+00
                                                     Tc-99      8.340E+02
                                                     Th-228     3.220E+00
                                                     Th-232     3.220E+00
                                                     U-235      3.200E+01
                                                     U-238      9.020E+01
0
                         Total Dose TDOSE(t), mrem/yr
                    Basic Radiation Dose Limit = 2.500E+01 mrem/yr
   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  7.000E+01
     TDOSE(t):  1.873E+02  1.841E+02  1.780E+02  1.593E+02  1.232E+02  7.703E+01
         M(t):  7.490E+00  7.366E+00  7.121E+00  6.374E+00  4.927E+00  3.081E+00
0Maximum TDOSE(t):  1.873E+02 mrem/yr   at t = 0.000E+00 years
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.226E+02	0.6549	2.366E+00	0.0126	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.802E-05	0.0000	1.557E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.996E+00	0.0320	2.097E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.396E+01	0.0745	4.909E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	7.202E-03	0.0000	1.778E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.594E+01	0.0851	2.474E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	8.058E-01	0.0043	1.402E-01	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.637E+01	0.0874	1.021E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	8.646E+00	0.0462	2.761E-01	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.843E+02	0.9844	2.916E+00	0.0156	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.250E+02	0.6675
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.585E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.996E+00	0.0320
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.396E+01	0.0746
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.220E-03	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.596E+01	0.0852
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.460E-01	0.0051
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.647E+01	0.0879
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.922E+00	0.0476
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.873E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.214E+02	0.6595	2.330E+00	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.797E-05	0.0000	1.545E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.794E+00	0.0315	2.176E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.642E+01	0.0892	1.108E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	2.221E-07	0.0000	5.445E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.107E+01	0.0601	1.710E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.655E+00	0.0144	1.403E-01	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.564E+01	0.0850	9.704E-02	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	8.259E+00	0.0449	2.624E-01	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.813E+02	0.9845	2.860E+00	0.0155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.238E+02	0.6721
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.573E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.794E+00	0.0315
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.644E+01	0.0893
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.226E-07	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.108E+01	0.0602
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.795E+00	0.0152
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.574E+01	0.0855
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.521E+00	0.0463
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.841E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.191E+02	0.6690	2.260E+00	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.786E-05	0.0000	1.521E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.410E+00	0.0304	2.299E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.686E+01	0.0947	1.543E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	2.111E-16	0.0000	5.108E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	5.334E+00	0.0300	8.174E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.731E+00	0.0378	1.417E-01	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.430E+01	0.0803	8.768E-02	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.535E+00	0.0423	2.369E-01	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.753E+02	0.9845	2.751E+00	0.0155	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.213E+02	0.6817
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.549E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.410E+00	0.0304
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.688E+01	0.0948
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.116E-16	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.342E+00	0.0300
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.873E+00	0.0386
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.438E+01	0.0808
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.772E+00	0.0437
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.780E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.111E+02	0.6975	2.026E+00	0.0127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.748E-05	0.0000	1.437E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.251E+00	0.0267	2.440E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	8.108E+00	0.0509	8.624E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	4.144E-01	0.0026	6.160E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.714E+01	0.1076	1.454E-01	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.042E+01	0.0654	6.142E-02	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	5.463E+00	0.0343	1.655E-01	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.569E+02	0.9849	2.409E+00	0.0151	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.132E+02	0.7102
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.464E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.251E+00	0.0267
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.117E+00	0.0509
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.151E-01	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.729E+01	0.1085
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.048E+01	0.0658
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.628E+00	0.0353
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.593E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	9.046E+01	0.7345	1.460E+00	0.0119	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.624E-05	0.0000	1.203E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.113E+00	0.0172	1.774E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	3.950E-01	0.0032	3.947E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.771E-04	0.0000	3.759E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.217E+01	0.1800	1.304E-01	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	4.195E+00	0.0341	2.195E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.160E+00	0.0175	5.852E-02	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.215E+02	0.9864	1.673E+00	0.0136	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.192E+01	0.7463
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.229E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.113E+00	0.0172
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.954E-01	0.0032
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E-04	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.230E+01	0.1811
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.217E+00	0.0342
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.219E+00	0.0180
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	5.627E+01	0.7305	6.880E-01	0.0089	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.276E-05	0.0000	7.646E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.855E-01	0.0063	4.615E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	7.398E-04	0.0000	5.972E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.153E-10	0.0000	1.269E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.853E+01	0.2406	8.683E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	6.411E-01	0.0083	2.544E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	3.171E-01	0.0041	6.631E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	7.625E+01	0.9898	7.848E-01	0.0102	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.696E+01	0.7394
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.874E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.855E-01	0.0063
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.404E-04	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.154E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.862E+01	0.2417
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.436E-01	0.0084
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.237E-01	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.703E+01	1.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
Np-237+D	Np-237+D	1.000E+00	7.530E-01	7.456E-01	7.310E-01	6.817E-01	5.537E-01	3.431E-01
Np-237+D	U-233	1.000E+00	9.758E-09	2.846E-08	6.239E-08	1.504E-07	2.373E-07	1.686E-07
Np-237+D	Th-229+D	1.000E+00	7.534E-11	5.188E-10	2.642E-09	2.074E-08	1.219E-07	3.245E-07
Np-237+D	äDSR(j)		7.530E-01	7.456E-01	7.310E-01	6.817E-01	5.537E-01	3.431E-01
0Pu-239	Pu-239	1.000E+00	1.157E-02	1.148E-02	1.130E-02	1.069E-02	8.972E-03	5.747E-03
Pu-239	U-235+D	1.000E+00	2.551E-10	7.497E-10	1.671E-09	4.283E-09	8.196E-09	9.127E-09
Pu-239	Pa-231	1.000E+00	5.493E-16	3.741E-15	1.858E-14	1.333E-13	6.096E-13	1.034E-12
Pu-239	Ac-227+D	1.000E+00	4.030E-17	5.749E-16	5.997E-15	1.075E-13	9.526E-13	2.144E-12
Pu-239	äDSR(j)		1.157E-02	1.148E-02	1.130E-02	1.069E-02	8.972E-03	5.747E-03
0Ra-226+D	Ra-226+D	1.000E+00	6.677E+00	6.452E+00	6.024E+00	4.733E+00	2.352E+00	5.402E-01
Ra-226+D	Pb-210+D	1.000E+00	7.409E-05	2.138E-04	4.575E-04	1.011E-03	1.232E-03	5.068E-04
Ra-226+D	äDSR(j)		6.677E+00	6.452E+00	6.025E+00	4.734E+00	2.353E+00	5.407E-01
0Ra-228+D	Ra-228+D	1.000E+00	3.433E+00	2.942E+00	2.161E+00	7.331E-01	3.306E-02	6.260E-05
Ra-228+D	Th-228+D	1.000E+00	9.039E-01	2.162E+00	3.081E+00	1.788E+00	8.972E-02	1.673E-04
Ra-228+D	äDSR(j)		4.336E+00	5.104E+00	5.242E+00	2.521E+00	1.228E-01	2.299E-04
0Tc-99	Tc-99	1.000E+00	8.657E-06	2.669E-10	2.537E-19	0.000E+00	0.000E+00	0.000E+00
0Th-228+D	Th-228+D	1.000E+00	4.957E+00	3.442E+00	1.659E+00	1.289E-01	8.616E-05	3.585E-11
0Th-232	Th-232	1.000E+00	4.385E-02	4.356E-02	4.297E-02	4.093E-02	3.508E-02	2.341E-02
Th-232	Ra-228+D	1.000E+00	2.121E-01	5.947E-01	1.201E+00	2.286E+00	2.686E+00	2.258E+00
Th-232	Th-228+D	1.000E+00	3.788E-02	2.298E-01	8.904E-01	3.041E+00	4.204E+00	3.501E+00
Th-232	äDSR(j)		2.938E-01	8.681E-01	2.134E+00	5.368E+00	6.925E+00	5.783E+00
0U-235+D	U-235+D	1.000E+00	5.146E-01	4.919E-01	4.495E-01	3.276E-01	1.317E-01	2.008E-02
U-235+D	Pa-231	1.000E+00	1.662E-06	4.783E-06	1.018E-05	2.203E-05	2.489E-05	8.158E-06
U-235+D	Ac-227+D	1.000E+00	1.619E-07	1.060E-06	4.823E-06	2.554E-05	5.311E-05	2.238E-05
U-235+D	äDSR(j)		5.146E-01	4.919E-01	4.495E-01	3.276E-01	1.318E-01	2.011E-02
0U-238	U-238	5.400E-05	1.692E-07	1.609E-07	1.453E-07	1.016E-07	3.607E-08	4.147E-09
0U-238+D	U-238+D	9.999E-01	9.891E-02	9.447E-02	8.617E-02	6.240E-02	2.460E-02	3.589E-03
U-238+D	U-234	9.999E-01	5.205E-09	1.493E-08	3.154E-08	6.640E-08	6.907E-08	1.881E-08
U-238+D	Th-230	9.999E-01	3.945E-14	2.679E-13	1.322E-12	9.260E-12	3.944E-11	5.736E-11
U-238+D	Ra-226+D	9.999E-01	3.049E-15	4.449E-14	4.880E-13	1.036E-11	1.346E-10	4.791E-10
U-238+D	Pb-210+D	9.999E-01	1.364E-20	4.100E-19	9.648E-18	5.887E-16	2.072E-14	1.533E-13
U-238+D	äDSR(j)		9.891E-02	9.447E-02	8.617E-02	6.240E-02	2.460E-02	3.589E-03

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide

(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	3.320E+01	3.353E+01	3.420E+01	3.667E+01	4.515E+01	7.286E+01
Pu-239	2.160E+03	2.177E+03	2.212E+03	2.339E+03	2.786E+03	4.350E+03
Ra-226	3.744E+00	3.875E+00	4.150E+00	5.281E+00	1.062E+01	4.624E+01
Ra-228	5.765E+00	4.898E+00	4.769E+00	9.918E+00	2.036E+02	1.087E+05
Tc-99	2.888E+06	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10
Th-228	5.043E+00	7.263E+00	1.507E+01	1.939E+02	2.901E+05	6.974E+11
Th-232	8.509E+01	2.880E+01	1.171E+01	4.657E+00	3.610E+00	4.323E+00
U-235	4.858E+01	5.082E+01	5.562E+01	7.631E+01	1.897E+02	1.243E+03
U-238	2.527E+02	2.646E+02	2.901E+02	4.007E+02	1.016E+03	6.966E+03
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ

*At specific activity limit

0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide

(i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	1.660E+02	0.000E+00	7.530E-01	3.320E+01	7.530E-01	3.320E+01
Pu-239	1.370E-01	0.000E+00	1.157E-02	2.160E+03	1.157E-02	2.160E+03
Ra-226	8.980E-01	0.000E+00	6.677E+00	3.744E+00	6.677E+00	3.744E+00
Ra-228	3.220E+00	2.135 ñ 0.004	5.340E+00	4.682E+00	4.336E+00	5.765E+00
Tc-99	8.340E+02	0.000E+00	8.657E-06	2.888E+06	8.657E-06	2.888E+06
Th-228	3.220E+00	0.000E+00	4.957E+00	5.043E+00	4.957E+00	5.043E+00
Th-232	3.220E+00	27.04 ñ 0.05	6.940E+00	3.602E+00	2.938E-01	8.509E+01
U-235	3.200E+01	0.000E+00	5.146E-01	4.858E+01	5.146E-01	4.858E+01
U-238	9.020E+01	0.000E+00	9.891E-02	2.527E+02	9.891E-02	2.527E+02
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.250E+02	1.238E+02	1.213E+02	1.132E+02	9.192E+01	5.696E+01
0U-233	Np-237	1.000E+00	1.620E-06	4.724E-06	1.036E-05	2.496E-05	3.940E-05	2.798E-05
0Th-229	Np-237	1.000E+00	1.251E-08	8.612E-08	4.386E-07	3.442E-06	2.023E-05	5.387E-05
0Pu-239	Pu-239	1.000E+00	1.585E-03	1.573E-03	1.549E-03	1.464E-03	1.229E-03	7.874E-04
0U-235	Pu-239	1.000E+00	3.495E-11	1.027E-10	2.290E-10	5.868E-10	1.123E-09	1.250E-09
U-235	U-235	1.000E+00	1.647E+01	1.574E+01	1.438E+01	1.048E+01	4.214E+00	6.427E-01
U-235	äDOSE(j)		1.647E+01	1.574E+01	1.438E+01	1.048E+01	4.214E+00	6.427E-01
0Pa-231	Pu-239	1.000E+00	7.526E-17	5.125E-16	2.546E-15	1.826E-14	8.352E-14	1.416E-13
Pa-231	U-235	1.000E+00	5.318E-05	1.531E-04	3.258E-04	7.049E-04	7.965E-04	2.610E-04
Pa-231	äDOSE(j)		5.318E-05	1.531E-04	3.258E-04	7.049E-04	7.965E-04	2.610E-04
0Ac-227	Pu-239	1.000E+00	5.522E-18	7.876E-17	8.216E-16	1.473E-14	1.305E-13	2.937E-13
Ac-227	U-235	1.000E+00	5.180E-06	3.392E-05	1.543E-04	8.173E-04	1.700E-03	7.161E-04
Ac-227	äDOSE(j)		5.180E-06	3.392E-05	1.543E-04	8.173E-04	1.700E-03	7.161E-04
0Ra-226	Ra-226	1.000E+00	5.996E+00	5.794E+00	5.410E+00	4.251E+00	2.112E+00	4.851E-01
Ra-226	U-238	9.999E-01	2.750E-13	4.013E-12	4.402E-11	9.340E-10	1.214E-08	4.322E-08
Ra-226	äDOSE(j)		5.996E+00	5.794E+00	5.410E+00	4.251E+00	2.112E+00	4.851E-01
0Pb-210	Ra-226	1.000E+00	6.653E-05	1.920E-04	4.109E-04	9.081E-04	1.106E-03	4.551E-04
Pb-210	U-238	9.999E-01	1.230E-18	3.698E-17	8.703E-16	5.310E-14	1.869E-12	1.383E-11
Pb-210	äDOSE(j)		6.653E-05	1.920E-04	4.109E-04	9.081E-04	1.106E-03	4.551E-04
0Ra-228	Ra-228	1.000E+00	1.105E+01	9.473E+00	6.958E+00	2.361E+00	1.065E-01	2.016E-04
Ra-228	Th-232	1.000E+00	6.828E-01	1.915E+00	3.867E+00	7.362E+00	8.648E+00	7.272E+00
Ra-228	äDOSE(j)		1.174E+01	1.139E+01	1.083E+01	9.723E+00	8.755E+00	7.272E+00
0Th-228	Ra-228	1.000E+00	2.910E+00	6.962E+00	9.921E+00	5.756E+00	2.889E-01	5.388E-04
Th-228	Th-228	1.000E+00	1.596E+01	1.108E+01	5.342E+00	4.151E-01	2.774E-04	1.154E-10
Th-228	Th-232	1.000E+00	1.220E-01	7.400E-01	2.867E+00	9.792E+00	1.354E+01	1.127E+01
Th-228	äDOSE(j)		1.899E+01	1.879E+01	1.813E+01	1.596E+01	1.383E+01	1.127E+01
0Tc-99	Tc-99	1.000E+00	7.220E-03	2.226E-07	2.116E-16	0.000E+00	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	1.412E-01	1.403E-01	1.384E-01	1.318E-01	1.130E-01	7.539E-02
0U-238	U-238	5.400E-05	1.527E-05	1.451E-05	1.311E-05	9.166E-06	3.254E-06	3.741E-07
U-238	U-238	9.999E-01	8.922E+00	8.521E+00	7.772E+00	5.628E+00	2.219E+00	3.237E-01
U-238	äDOSE(j)		8.922E+00	8.521E+00	7.772E+00	5.628E+00	2.219E+00	3.237E-01
0U-234	U-238	9.999E-01	4.695E-07	1.347E-06	2.845E-06	5.990E-06	6.230E-06	1.697E-06
0Th-230	U-238	9.999E-01	3.559E-12	2.416E-11	1.192E-10	8.352E-10	3.558E-09	5.174E-09
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THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.660E+02	1.646E+02	1.618E+02	1.523E+02	1.282E+02	9.076E+01
0U-233	Np-237	1.000E+00	0.000E+00	7.070E-04	2.013E-03	5.602E-03	1.033E-02	1.022E-02
0Th-229	Np-237	1.000E+00	0.000E+00	3.368E-08	2.927E-07	2.885E-06	1.888E-05	5.936E-05
0Pu-239	Pu-239	1.000E+00	1.370E-01	1.368E-01	1.365E-01	1.354E-01	1.324E-01	1.265E-01
0U-235	Pu-239	1.000E+00	0.000E+00	1.319E-10	3.784E-10	1.084E-09	2.195E-09	2.748E-09
U-235	U-235	1.000E+00	3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
U-235	äS(j):		3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.385E-15	1.175E-14	1.064E-13	5.503E-13	1.139E-12
Pa-231	U-235	1.000E+00	0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
Pa-231	äS(j):		0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
0Ac-227	Pu-239	1.000E+00	0.000E+00	1.430E-17	3.446E-16	8.712E-15	8.892E-14	2.400E-13
Ac-227	U-235	1.000E+00	0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
Ac-227	äS(j):		0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
0Ra-226	Ra-226	1.000E+00	8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
Ra-226	U-238	9.999E-01	0.000E+00	1.613E-13	4.100E-12	1.233E-10	1.873E-09	8.260E-09
Ra-226	äS(j):		8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
0Pb-210	Ra-226	1.000E+00	0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
Pb-210	U-238	9.999E-01	0.000E+00	1.247E-15	9.427E-14	9.148E-12	3.788E-10	3.191E-09
Pb-210	äS(j):		0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
0Ra-228	Ra-228	1.000E+00	3.220E+00	2.765E+00	2.040E+00	7.029E-01	3.349E-02	7.603E-05
Ra-228	Th-232	1.000E+00	0.000E+00	3.601E-01	9.348E-01	1.993E+00	2.522E+00	2.544E+00
Ra-228	äS(j):		3.220E+00	3.125E+00	2.974E+00	2.696E+00	2.555E+00	2.544E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	9.037E-01	1.645E+00	1.064E+00	5.763E-02	1.311E-04
Th-228	Th-228	1.000E+00	3.220E+00	2.241E+00	1.086E+00	8.594E-02	6.121E-05	3.105E-11
Th-228	Th-232	1.000E+00	0.000E+00	5.940E-02	3.877E-01	1.639E+00	2.502E+00	2.544E+00
Th-228	äS(j):		3.220E+00	3.204E+00	3.118E+00	2.789E+00	2.560E+00	2.544E+00
0Tc-99	Tc-99	1.000E+00	8.340E+02	2.572E-02	2.445E-11	1.169E-42	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	3.220E+00	3.220E+00	3.220E+00	3.219E+00	3.216E+00	3.212E+00
0U-238	U-238	5.400E-05	4.871E-03	4.660E-03	4.265E-03	3.129E-03	1.291E-03	2.199E-04
U-238	U-238	9.999E-01	9.020E+01	8.629E+01	7.898E+01	5.794E+01	2.391E+01	4.072E+00
U-238	äS(j):		9.020E+01	8.630E+01	7.899E+01	5.794E+01	2.391E+01	4.072E+00
0U-234	U-238	9.999E-01	0.000E+00	2.446E-04	6.717E-04	1.643E-03	2.033E-03	8.080E-04
0Th-230	U-238	9.999E-01	0.000E+00	1.117E-09	9.485E-09	8.615E-08	4.498E-07	9.562E-07
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 13.60 seconds

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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(3)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(4)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(5)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(6)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(7)
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(8)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(9)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(10)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(11)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(12)
B-1	U-233	1.350E-01	1.350E-01	DCF2(13)
B-1	U-234	1.320E-01	1.320E-01	DCF2(14)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(15)
B-1	U-238	1.180E-01	1.180E-01	DCF2(16)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(17)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(2)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(3)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(4)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(5)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(6)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(7)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(8)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(9)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(10)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(11)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(12)
D-1	U-233	2.890E-04	2.890E-04	DCF3(13)
D-1	U-234	2.830E-04	2.830E-04	DCF3(14)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(15)
D-1	U-238	2.550E-04	2.550E-04	DCF3(16)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(17)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

0 Menu	Parameter		Current Value	Base Case*	Parameter Name
D-34	Pb-210+D	, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pb-210+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(4,2)
D-34	Pb-210+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(4,3)
D-34					
D-34	Pu-239	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Pu-239	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Pu-239	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(5,3)
D-34					
D-34	Ra-226+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-226+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-226+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34					
D-34	Ra-228+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(7,1)
D-34	Ra-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,2)
D-34	Ra-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,3)
D-34					
D-34	Tc-99	, plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(8,1)
D-34	Tc-99	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Tc-99	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34					
D-34	Th-228+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34					
D-34	Th-229+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-229+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-229+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34					
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(11,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(11,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(12,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(12,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34					
D-34	U-233	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-233	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-233	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(15,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(15,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(15,3)
D-34					
D-34	U-238	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(16,1)
D-34	U-238	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(16,2)
D-34	U-238	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(16,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(17,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(17,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(17,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(3,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(3,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(4,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(7,2)
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(8,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(8,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(11,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(12,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(15,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(16,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(16,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(17,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(17,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	7.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	not used	3.000E+02	---	T(7)
R011	Times for calculations (yr)	not used	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Np-237	1.660E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.370E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.980E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.220E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.340E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-228	3.220E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Th-232	3.220E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	3.200E+01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): U-238	9.020E+01	0.000E+00	---	S1(16)
R012	Concentration in groundwater (pCi/L): Np-237	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(16)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.625E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.111E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.039E+01	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.099E-01	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.217E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R017	Inhalation rate (m**3/yr)	6.997E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	2.400E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	8.800E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	8.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed
Find peak pathway doses	active

```
      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:  10000.00 square meters                Np-237     1.660E+02
   Thickness:      0.15 meters                       Pu-239     1.370E-01
 Cover Depth:      0.00 meters                       Ra-226     8.980E-01
                                                     Ra-228     3.220E+00
                                                     Tc-99      8.340E+02
                                                     Th-228     3.220E+00
                                                     Th-232     3.220E+00
                                                     U-235      3.200E+01
                                                     U-238      9.020E+01
0
                          Total Dose TDOSE(t), mrem/yr
                     Basic Radiation Dose Limit = 2.500E+01 mrem/yr
   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  7.000E+01
     TDOSE(t):  1.795E+02  1.765E+02  1.706E+02  1.526E+02  1.178E+02  7.342E+01
         M(t):  7.178E+00  7.059E+00  6.823E+00  6.105E+00  4.712E+00  2.937E+00
0Maximum TDOSE(t):  1.795E+02 mrem/yr   at t = 0.000E+00 years
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.156E+02	0.6444	4.552E+00	0.0254	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.643E-05	0.0000	2.996E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.655E+00	0.0315	4.034E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.316E+01	0.0734	9.444E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	6.792E-03	0.0000	3.420E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.503E+01	0.0838	4.759E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	7.599E-01	0.0042	2.697E-01	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.543E+01	0.0860	1.964E-01	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	8.154E+00	0.0454	5.312E-01	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.739E+02	0.9687	5.610E+00	0.0313	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.202E+02	0.6698
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.022E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.655E+00	0.0315
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.317E+01	0.0734
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.826E-03	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.508E+01	0.0840
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E+00	0.0057
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.563E+01	0.0871
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.685E+00	0.0484
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.795E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.145E+02	0.6490	4.483E+00	0.0254	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.638E-05	0.0000	2.972E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.464E+00	0.0310	4.187E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.549E+01	0.0878	2.132E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	2.094E-07	0.0000	1.047E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.044E+01	0.0591	3.290E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.504E+00	0.0142	2.699E-01	0.0015	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.475E+01	0.0836	1.867E-01	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.789E+00	0.0441	5.048E-01	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.710E+02	0.9688	5.502E+00	0.0312	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.190E+02	0.6744
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.999E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.465E+00	0.0310
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.551E+01	0.0879
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.105E-07	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.047E+01	0.0593
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E+00	0.0157
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.494E+01	0.0847
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.294E+00	0.0470
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.765E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.123E+02	0.6584	4.347E+00	0.0255	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.628E-05	0.0000	2.926E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	5.102E+00	0.0299	4.423E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.590E+01	0.0932	2.968E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	1.991E-16	0.0000	9.826E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	5.031E+00	0.0295	1.572E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.348E+00	0.0372	2.726E-01	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.348E+01	0.0790	1.687E-01	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.107E+00	0.0417	4.558E-01	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.653E+02	0.9690	5.293E+00	0.0310	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.167E+02	0.6839
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.952E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.102E+00	0.0299
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.593E+01	0.0934
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.001E-16	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.046E+00	0.0296
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.621E+00	0.0388
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.365E+01	0.0800
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.562E+00	0.0443
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.706E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.048E+02	0.6867	3.897E+00	0.0255	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.592E-05	0.0000	2.764E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.009E+00	0.0263	4.693E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	7.647E+00	0.0501	1.659E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	3.909E-01	0.0026	1.185E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.616E+01	0.1059	2.797E-01	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	9.830E+00	0.0644	1.182E-01	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	5.152E+00	0.0338	3.184E-01	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.480E+02	0.9696	4.634E+00	0.0304	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.087E+02	0.7122
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.790E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.010E+00	0.0263
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.663E+00	0.0502
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.920E-01	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.644E+01	0.1077
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.948E+00	0.0652
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.470E+00	0.0358
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.526E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	8.531E+01	0.7242	2.809E+00	0.0238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.475E-05	0.0000	2.314E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.993E+00	0.0169	3.412E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	3.725E-01	0.0032	7.593E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.613E-04	0.0000	7.231E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.091E+01	0.1775	2.509E-01	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	3.956E+00	0.0336	4.222E-02	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.037E+00	0.0173	1.126E-01	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	1.146E+02	0.9727	3.218E+00	0.0273	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.812E+01	0.7481
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.339E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.993E+00	0.0169
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.733E-01	0.0032
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.620E-04	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.116E+01	0.1796
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.998E+00	0.0339
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.150E+00	0.0182
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.178E+02	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	5.307E+01	0.7228	1.324E+00	0.0180	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	2.147E-05	0.0000	1.471E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	4.578E-01	0.0062	8.878E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	6.977E-04	0.0000	1.149E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.087E-10	0.0000	2.441E-13	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.748E+01	0.2381	1.670E-01	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	6.046E-01	0.0082	4.895E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.990E-01	0.0041	1.276E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	7.191E+01	0.9794	1.510E+00	0.0206	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.439E+01	0.7408
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.492E-03	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.579E-01	0.0062
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.988E-04	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.090E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.765E+01	0.2403
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.095E-01	0.0083
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.118E-01	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.342E+01	1.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
Np-237+D	Np-237+D	1.000E+00	7.241E-01	7.169E-01	7.028E-01	6.549E-01	5.308E-01	3.277E-01
Np-237+D	U-233	1.000E+00	1.674E-08	4.878E-08	1.068E-07	2.564E-07	3.992E-07	2.736E-07
Np-237+D	Th-229+D	1.000E+00	7.487E-11	5.155E-10	2.624E-09	2.056E-08	1.202E-07	3.168E-07
Np-237+D	äDSR(j)		7.241E-01	7.169E-01	7.028E-01	6.549E-01	5.308E-01	3.277E-01
0Pu-239	Pu-239	1.000E+00	2.206E-02	2.189E-02	2.155E-02	2.036E-02	1.707E-02	1.089E-02
Pu-239	U-235+D	1.000E+00	2.422E-10	7.116E-10	1.586E-09	4.064E-09	7.771E-09	8.642E-09
Pu-239	Pa-231	1.000E+00	6.309E-16	4.293E-15	2.129E-14	1.519E-13	6.839E-13	1.123E-12
Pu-239	Ac-227+D	1.000E+00	4.262E-17	6.076E-16	6.332E-15	1.131E-13	9.916E-13	2.185E-12
Pu-239	äDSR(j)		2.206E-02	2.189E-02	2.155E-02	2.036E-02	1.707E-02	1.089E-02
0Ra-226+D	Ra-226+D	1.000E+00	6.297E+00	6.085E+00	5.682E+00	4.464E+00	2.218E+00	5.094E-01
Ra-226+D	Pb-210+D	1.000E+00	7.897E-05	2.277E-04	4.868E-04	1.071E-03	1.289E-03	5.160E-04
Ra-226+D	äDSR(j)		6.297E+00	6.085E+00	5.682E+00	4.465E+00	2.219E+00	5.099E-01
0Ra-228+D	Ra-228+D	1.000E+00	3.237E+00	2.775E+00	2.038E+00	6.914E-01	3.118E-02	5.904E-05
Ra-228+D	Th-228+D	1.000E+00	8.538E-01	2.042E+00	2.910E+00	1.688E+00	8.473E-02	1.580E-04
Ra-228+D	äDSR(j)		4.091E+00	4.817E+00	4.948E+00	2.380E+00	1.159E-01	2.170E-04
0Tc-99	Tc-99	1.000E+00	8.185E-06	2.524E-10	2.399E-19	0.000E+00	0.000E+00	0.000E+00
0Th-228+D	Th-228+D	1.000E+00	4.683E+00	3.251E+00	1.567E+00	1.218E-01	8.137E-05	3.385E-11
0Th-232	Th-232	1.000E+00	8.399E-02	8.343E-02	8.231E-02	7.837E-02	6.713E-02	4.470E-02
Th-232	Ra-228+D	1.000E+00	2.000E-01	5.608E-01	1.133E+00	2.156E+00	2.533E+00	2.130E+00
Th-232	Th-228+D	1.000E+00	3.578E-02	2.171E-01	8.411E-01	2.872E+00	3.971E+00	3.305E+00
Th-232	äDSR(j)		3.198E-01	8.614E-01	2.056E+00	5.107E+00	6.571E+00	5.480E+00
0U-235+D	U-235+D	1.000E+00	4.884E-01	4.669E-01	4.266E-01	3.108E-01	1.249E-01	1.902E-02
U-235+D	Pa-231	1.000E+00	1.909E-06	5.490E-06	1.167E-05	2.511E-05	2.792E-05	8.858E-06
U-235+D	Ac-227+D	1.000E+00	1.712E-07	1.120E-06	5.092E-06	2.687E-05	5.528E-05	2.281E-05
U-235+D	äDSR(j)		4.884E-01	4.669E-01	4.266E-01	3.109E-01	1.250E-01	1.905E-02
0U-238	U-238	5.400E-05	3.217E-07	3.057E-07	2.761E-07	1.930E-07	6.836E-08	7.802E-09
0U-238+D	U-238+D	9.999E-01	9.629E-02	9.195E-02	8.384E-02	6.064E-02	2.383E-02	3.457E-03
U-238+D	U-234	9.999E-01	9.627E-09	2.761E-08	5.830E-08	1.225E-07	1.266E-07	3.385E-08
U-238+D	Th-230	9.999E-01	7.241E-14	4.916E-13	2.424E-12	1.695E-11	7.167E-11	1.021E-10
U-238+D	Ra-226+D	9.999E-01	2.875E-15	4.196E-14	4.602E-13	9.766E-12	1.270E-10	4.519E-10
U-238+D	Pb-210+D	9.999E-01	1.454E-20	4.367E-19	1.027E-17	6.236E-16	2.167E-14	1.561E-13
U-238+D	äDSR(j)		9.629E-02	9.195E-02	8.384E-02	6.064E-02	2.383E-02	3.457E-03

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide

(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	3.453E+01	3.487E+01	3.557E+01	3.818E+01	4.710E+01	7.630E+01
Pu-239	1.133E+03	1.142E+03	1.160E+03	1.228E+03	1.464E+03	2.295E+03
Ra-226	3.970E+00	4.108E+00	4.400E+00	5.599E+00	1.126E+01	4.902E+01
Ra-228	6.111E+00	5.190E+00	5.052E+00	1.050E+01	2.157E+02	1.152E+05
Tc-99	3.054E+06	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10
Th-228	5.339E+00	7.689E+00	1.595E+01	2.053E+02	3.072E+05	7.386E+11
Th-232	7.818E+01	2.902E+01	1.216E+01	4.895E+00	3.805E+00	4.562E+00
U-235	5.118E+01	5.354E+01	5.860E+01	8.042E+01	2.001E+02	1.313E+03
U-238	2.596E+02	2.719E+02	2.982E+02	4.122E+02	1.049E+03	7.232E+03
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

*At specific activity limit

0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide

(i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	1.660E+02	0.000E+00	7.241E-01	3.453E+01	7.241E-01	3.453E+01
Pu-239	1.370E-01	0.000E+00	2.206E-02	1.133E+03	2.206E-02	1.133E+03
Ra-226	8.980E-01	0.000E+00	6.297E+00	3.970E+00	6.297E+00	3.970E+00
Ra-228	3.220E+00	2.135 ñ 0.004	5.040E+00	4.960E+00	4.091E+00	6.111E+00
Tc-99	8.340E+02	0.000E+00	8.185E-06	3.054E+06	8.185E-06	3.054E+06
Th-228	3.220E+00	0.000E+00	4.683E+00	5.339E+00	4.683E+00	5.339E+00
Th-232	3.220E+00	26.96 ñ 0.05	6.586E+00	3.796E+00	3.198E-01	7.818E+01
U-235	3.200E+01	0.000E+00	4.884E-01	5.118E+01	4.884E-01	5.118E+01
U-238	9.020E+01	0.000E+00	9.629E-02	2.596E+02	9.629E-02	2.596E+02
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.202E+02	1.190E+02	1.167E+02	1.087E+02	8.812E+01	5.439E+01
0U-233	Np-237	1.000E+00	2.778E-06	8.098E-06	1.773E-05	4.256E-05	6.627E-05	4.541E-05
0Th-229	Np-237	1.000E+00	1.243E-08	8.557E-08	4.356E-07	3.413E-06	1.995E-05	5.260E-05
0Pu-239	Pu-239	1.000E+00	3.022E-03	2.999E-03	2.952E-03	2.790E-03	2.339E-03	1.492E-03
0U-235	Pu-239	1.000E+00	3.318E-11	9.749E-11	2.173E-10	5.568E-10	1.065E-09	1.184E-09
U-235	U-235	1.000E+00	1.563E+01	1.494E+01	1.365E+01	9.946E+00	3.996E+00	6.085E-01
U-235	äDOSE(j)		1.563E+01	1.494E+01	1.365E+01	9.946E+00	3.996E+00	6.085E-01
0Pa-231	Pu-239	1.000E+00	8.643E-17	5.882E-16	2.917E-15	2.082E-14	9.370E-14	1.538E-13
Pa-231	U-235	1.000E+00	6.108E-05	1.757E-04	3.734E-04	8.034E-04	8.936E-04	2.835E-04
Pa-231	äDOSE(j)		6.108E-05	1.757E-04	3.734E-04	8.034E-04	8.936E-04	2.835E-04
0Ac-227	Pu-239	1.000E+00	5.838E-18	8.324E-17	8.675E-16	1.550E-14	1.359E-13	2.994E-13
Ac-227	U-235	1.000E+00	5.478E-06	3.585E-05	1.629E-04	8.598E-04	1.769E-03	7.300E-04
Ac-227	äDOSE(j)		5.478E-06	3.585E-05	1.629E-04	8.598E-04	1.769E-03	7.300E-04
0Ra-226	Ra-226	1.000E+00	5.655E+00	5.464E+00	5.102E+00	4.009E+00	1.992E+00	4.575E-01
Ra-226	U-238	9.999E-01	2.594E-13	3.785E-12	4.151E-11	8.809E-10	1.145E-08	4.076E-08
Ra-226	äDOSE(j)		5.655E+00	5.464E+00	5.102E+00	4.009E+00	1.992E+00	4.575E-01
0Pb-210	Ra-226	1.000E+00	7.092E-05	2.045E-04	4.372E-04	9.620E-04	1.157E-03	4.634E-04
Pb-210	U-238	9.999E-01	1.311E-18	3.939E-17	9.259E-16	5.625E-14	1.954E-12	1.408E-11
Pb-210	äDOSE(j)		7.092E-05	2.045E-04	4.372E-04	9.620E-04	1.157E-03	4.634E-04
0Ra-228	Ra-228	1.000E+00	1.042E+01	8.934E+00	6.562E+00	2.226E+00	1.004E-01	1.901E-04
Ra-228	Th-232	1.000E+00	6.440E-01	1.806E+00	3.648E+00	6.943E+00	8.156E+00	6.858E+00
Ra-228	äDOSE(j)		1.107E+01	1.074E+01	1.021E+01	9.170E+00	8.257E+00	6.858E+00
0Th-228	Ra-228	1.000E+00	2.749E+00	6.576E+00	9.372E+00	5.437E+00	2.728E-01	5.087E-04
Th-228	Th-228	1.000E+00	1.508E+01	1.047E+01	5.046E+00	3.920E-01	2.620E-04	1.090E-10
Th-228	Th-232	1.000E+00	1.152E-01	6.990E-01	2.708E+00	9.249E+00	1.279E+01	1.064E+01
Th-228	äDOSE(j)		1.794E+01	1.774E+01	1.713E+01	1.508E+01	1.306E+01	1.064E+01
0Tc-99	Tc-99	1.000E+00	6.826E-03	2.105E-07	2.001E-16	0.000E+00	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	2.705E-01	2.687E-01	2.650E-01	2.524E-01	2.162E-01	1.439E-01
0U-238	U-238	5.400E-05	2.901E-05	2.758E-05	2.490E-05	1.741E-05	6.166E-06	7.037E-07
U-238	U-238	9.999E-01	8.685E+00	8.294E+00	7.562E+00	5.470E+00	2.150E+00	3.118E-01
U-238	äDOSE(j)		8.685E+00	8.294E+00	7.562E+00	5.470E+00	2.150E+00	3.118E-01
0U-234	U-238	9.999E-01	8.684E-07	2.490E-06	5.258E-06	1.105E-05	1.142E-05	3.053E-06
0Th-230	U-238	9.999E-01	6.531E-12	4.434E-11	2.187E-10	1.528E-09	6.464E-09	9.205E-09
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.660E+02	1.646E+02	1.618E+02	1.523E+02	1.282E+02	9.076E+01
0U-233	Np-237	1.000E+00	0.000E+00	7.070E-04	2.013E-03	5.602E-03	1.033E-02	1.022E-02
0Th-229	Np-237	1.000E+00	0.000E+00	3.368E-08	2.927E-07	2.885E-06	1.888E-05	5.936E-05
0Pu-239	Pu-239	1.000E+00	1.370E-01	1.368E-01	1.365E-01	1.354E-01	1.324E-01	1.265E-01
0U-235	Pu-239	1.000E+00	0.000E+00	1.319E-10	3.784E-10	1.084E-09	2.195E-09	2.748E-09
U-235	U-235	1.000E+00	3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
U-235	äS(j):		3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.385E-15	1.175E-14	1.064E-13	5.503E-13	1.139E-12
Pa-231	U-235	1.000E+00	0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
Pa-231	äS(j):		0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
0Ac-227	Pu-239	1.000E+00	0.000E+00	1.430E-17	3.446E-16	8.712E-15	8.892E-14	2.400E-13
Ac-227	U-235	1.000E+00	0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
Ac-227	äS(j):		0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
0Ra-226	Ra-226	1.000E+00	8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
Ra-226	U-238	9.999E-01	0.000E+00	1.613E-13	4.100E-12	1.233E-10	1.873E-09	8.260E-09
Ra-226	äS(j):		8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
0Pb-210	Ra-226	1.000E+00	0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
Pb-210	U-238	9.999E-01	0.000E+00	1.247E-15	9.427E-14	9.148E-12	3.788E-10	3.191E-09
Pb-210	äS(j):		0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
0Ra-228	Ra-228	1.000E+00	3.220E+00	2.765E+00	2.040E+00	7.029E-01	3.349E-02	7.603E-05
Ra-228	Th-232	1.000E+00	0.000E+00	3.601E-01	9.348E-01	1.993E+00	2.522E+00	2.544E+00
Ra-228	äS(j):		3.220E+00	3.125E+00	2.974E+00	2.696E+00	2.555E+00	2.544E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	9.037E-01	1.645E+00	1.064E+00	5.763E-02	1.311E-04
Th-228	Th-228	1.000E+00	3.220E+00	2.241E+00	1.086E+00	8.594E-02	6.121E-05	3.105E-11
Th-228	Th-232	1.000E+00	0.000E+00	5.940E-02	3.877E-01	1.639E+00	2.502E+00	2.544E+00
Th-228	äS(j):		3.220E+00	3.204E+00	3.118E+00	2.789E+00	2.560E+00	2.544E+00
0Tc-99	Tc-99	1.000E+00	8.340E+02	2.572E-02	2.445E-11	1.169E-42	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	3.220E+00	3.220E+00	3.220E+00	3.219E+00	3.216E+00	3.212E+00
0U-238	U-238	5.400E-05	4.871E-03	4.660E-03	4.265E-03	3.129E-03	1.291E-03	2.199E-04
U-238	U-238	9.999E-01	9.020E+01	8.629E+01	7.898E+01	5.794E+01	2.391E+01	4.072E+00
U-238	äS(j):		9.020E+01	8.630E+01	7.899E+01	5.794E+01	2.391E+01	4.072E+00
0U-234	U-238	9.999E-01	0.000E+00	2.446E-04	6.717E-04	1.643E-03	2.033E-03	8.080E-04
0Th-230	U-238	9.999E-01	0.000E+00	1.117E-09	9.485E-09	8.615E-08	4.498E-07	9.562E-07
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THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 18.73 seconds

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Dose Conversion Factor (and Related) Parameter Summary
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0 Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(3)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(4)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(5)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(6)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(7)
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(8)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(9)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(10)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(11)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(12)
B-1	U-233	1.350E-01	1.350E-01	DCF2(13)
B-1	U-234	1.320E-01	1.320E-01	DCF2(14)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(15)
B-1	U-238	1.180E-01	1.180E-01	DCF2(16)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(17)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(2)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(3)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(4)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(5)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(6)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(7)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(8)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(9)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(10)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(11)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(12)
D-1	U-233	2.890E-04	2.890E-04	DCF3(13)
D-1	U-234	2.830E-04	2.830E-04	DCF3(14)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(15)
D-1	U-238	2.550E-04	2.550E-04	DCF3(16)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(17)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)
D-34				

Dose Conversion Factor (and Related) Parameter Summary (continued)
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Menu	Parameter		Current Value	Base Case*	Parameter Name
D-34	Pb-210+D	, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pb-210+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(4,2)
D-34	Pb-210+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(4,3)
D-34					
D-34	Pu-239	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Pu-239	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Pu-239	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(5,3)
D-34					
D-34	Ra-226+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-226+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-226+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34					
D-34	Ra-228+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(7,1)
D-34	Ra-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,2)
D-34	Ra-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,3)
D-34					
D-34	Tc-99	, plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(8,1)
D-34	Tc-99	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Tc-99	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34					
D-34	Th-228+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34					
D-34	Th-229+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-229+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-229+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34					
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(11,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(11,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(12,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(12,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34					
D-34	U-233	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-233	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-233	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(15,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(15,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(15,3)
D-34					
D-34	U-238	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(16,1)
D-34	U-238	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(16,2)
D-34	U-238	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(16,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(17,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(17,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(17,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(3,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(3,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(4,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(7,2)
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(8,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(8,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(11,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(12,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(15,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(16,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(16,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(17,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(17,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	7.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	not used	3.000E+02	---	T(7)
R011	Times for calculations (yr)	not used	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Np-237	1.660E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.370E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.980E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.220E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.340E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-228	3.220E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Th-232	3.220E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	3.200E+01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): U-238	9.020E+01	0.000E+00	---	S1(16)
R012	Concentration in groundwater (pCi/L): Np-237	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(16)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.625E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.111E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.039E+01	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.099E-01	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.217E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R017	Inhalation rate (m**3/yr)	3.375E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	2.400E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.600E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed
Find peak pathway doses	active

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      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:  10000.00 square meters                Np-237     1.660E+02
   Thickness:      0.15 meters                       Pu-239     1.370E-01
 Cover Depth:      0.00 meters                       Ra-226     8.980E-01
                                                     Ra-228     3.220E+00
                                                     Tc-99      8.340E+02
                                                     Th-228     3.220E+00
                                                     Th-232     3.220E+00
                                                     U-235      3.200E+01
                                                     U-238      9.020E+01
0
                         Total Dose TDOSE(t), mrem/yr
                    Basic Radiation Dose Limit = 2.500E+01 mrem/yr
   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  7.000E+01
     TDOSE(t):  6.657E+01  6.546E+01  6.328E+01  5.663E+01  4.374E+01  2.730E+01
         M(t):  2.663E+00  2.619E+00  2.531E+00  2.265E+00  1.749E+00  1.092E+00
0Maximum TDOSE(t):  6.657E+01 mrem/yr   at t = 0.000E+00 years
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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	4.320E+01	0.6489	1.322E+00	0.0199	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	9.872E-06	0.0000	8.697E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.112E+00	0.0317	1.171E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.918E+00	0.0739	2.742E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	2.537E-03	0.0000	9.927E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	5.615E+00	0.0843	1.381E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.839E-01	0.0043	7.831E-02	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	5.765E+00	0.0866	5.702E-02	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	3.046E+00	0.0458	1.542E-01	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.494E+01	0.9755	1.629E+00	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.452E+01	0.6688
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.796E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.112E+00	0.0317
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.920E+00	0.0739
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.547E-03	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.629E+00	0.0845
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.622E-01	0.0054
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.823E+00	0.0875
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.200E+00	0.0481
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.657E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	4.278E+01	0.6535	1.301E+00	0.0199	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	9.854E-06	0.0000	8.629E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.041E+00	0.0312	1.215E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	5.786E+00	0.0884	6.190E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	7.823E-08	0.0000	3.041E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	3.899E+00	0.0596	9.551E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	9.353E-01	0.0143	7.834E-02	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	5.512E+00	0.0842	5.420E-02	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.910E+00	0.0444	1.465E-01	0.0022	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.387E+01	0.9756	1.597E+00	0.0244	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.408E+01	0.6734
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.728E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.041E+00	0.0312
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.792E+00	0.0885
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.854E-08	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.908E+00	0.0597
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.014E+00	0.0155
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.566E+00	0.0850
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.056E+00	0.0467
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.546E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	4.196E+01	0.6630	1.262E+00	0.0199	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	9.816E-06	0.0000	8.494E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.906E+00	0.0301	1.284E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	5.941E+00	0.0939	8.616E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	7.438E-17	0.0000	2.852E-19	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.879E+00	0.0297	4.565E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	2.371E+00	0.0375	7.914E-02	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	5.037E+00	0.0796	4.897E-02	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.655E+00	0.0420	1.323E-01	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.175E+01	0.9757	1.537E+00	0.0243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.322E+01	0.6829
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.592E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.906E+00	0.0301
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.950E+00	0.0940
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.466E-17	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.884E+00	0.0298
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.451E+00	0.0387
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.086E+00	0.0804
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.787E+00	0.0440
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.328E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.915E+01	0.6913	1.131E+00	0.0200	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	9.681E-06	0.0000	8.024E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.498E+00	0.0264	1.363E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.856E+00	0.0504	4.816E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.460E-01	0.0026	3.440E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.039E+00	0.1066	8.119E-02	0.0014	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	3.672E+00	0.0648	3.430E-02	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.925E+00	0.0340	9.244E-02	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	5.529E+01	0.9762	1.345E+00	0.0238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.028E+01	0.7113
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.120E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.498E+00	0.0264
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.861E+00	0.0505
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.464E-01	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.120E+00	0.1081
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.706E+00	0.0654
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.017E+00	0.0356
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.663E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.187E+01	0.7287	8.155E-01	0.0186	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	9.245E-06	0.0000	6.718E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	7.444E-01	0.0170	9.905E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	1.392E-01	0.0032	2.204E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	9.761E-05	0.0000	2.099E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	7.810E+00	0.1786	7.282E-02	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	1.478E+00	0.0338	1.226E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	7.610E-01	0.0174	3.268E-02	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.280E+01	0.9786	9.343E-01	0.0214	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.268E+01	0.7473
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.811E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.445E-01	0.0170
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.394E-01	0.0032
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.782E-05	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.883E+00	0.1802
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.490E+00	0.0341
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.937E-01	0.0181
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.374E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	1.982E+01	0.7261	3.842E-01	0.0141	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	8.019E-06	0.0000	4.270E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.710E-01	0.0063	2.577E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.606E-04	0.0000	3.335E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	4.062E-11	0.0000	7.086E-14	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	6.529E+00	0.2392	4.849E-02	0.0018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	2.259E-01	0.0083	1.421E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.117E-01	0.0041	3.703E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	2.686E+01	0.9839	4.383E-01	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.021E+01	0.7402
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.350E-04	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.711E-01	0.0063
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.610E-04	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.069E-11	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.578E+00	0.2409
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.273E-01	0.0083
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.154E-01	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.730E+01	1.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
Np-237+D	Np-237+D	1.000E+00	2.682E-01	2.656E-01	2.603E-01	2.427E-01	1.969E-01	1.217E-01
Np-237+D	U-233	1.000E+00	5.021E-09	1.464E-08	3.207E-08	7.706E-08	1.205E-07	8.347E-08
Np-237+D	Th-229+D	1.000E+00	2.735E-11	1.883E-10	9.587E-10	7.516E-09	4.404E-08	1.166E-07
Np-237+D	äDSR(j)		2.682E-01	2.656E-01	2.603E-01	2.427E-01	1.969E-01	1.217E-01
0Pu-239	Pu-239	1.000E+00	6.420E-03	6.371E-03	6.271E-03	5.927E-03	4.971E-03	3.176E-03
Pu-239	U-235+D	1.000E+00	9.021E-11	2.651E-10	5.909E-10	1.514E-09	2.896E-09	3.223E-09
Pu-239	Pa-231	1.000E+00	2.172E-16	1.479E-15	7.339E-15	5.248E-14	2.377E-13	3.952E-13
Pu-239	Ac-227+D	1.000E+00	1.517E-17	2.163E-16	2.255E-15	4.035E-14	3.552E-13	7.897E-13
Pu-239	äDSR(j)		6.420E-03	6.371E-03	6.271E-03	5.927E-03	4.971E-03	3.176E-03
0Ra-226+D	Ra-226+D	1.000E+00	2.352E+00	2.273E+00	2.122E+00	1.668E+00	8.285E-01	1.903E-01
Ra-226+D	Pb-210+D	1.000E+00	2.802E-05	8.081E-05	1.728E-04	3.810E-04	4.607E-04	1.866E-04
Ra-226+D	äDSR(j)		2.352E+00	2.273E+00	2.123E+00	1.668E+00	8.290E-01	1.905E-01
0Ra-228+D	Ra-228+D	1.000E+00	1.209E+00	1.036E+00	7.613E-01	2.583E-01	1.165E-02	2.206E-05
Ra-228+D	Th-228+D	1.000E+00	3.187E-01	7.624E-01	1.086E+00	6.303E-01	3.163E-02	5.899E-05
Ra-228+D	äDSR(j)		1.528E+00	1.799E+00	1.848E+00	8.886E-01	4.328E-02	8.104E-05
0Tc-99	Tc-99	1.000E+00	3.054E-06	9.417E-11	8.952E-20	0.000E+00	0.000E+00	0.000E+00
0Th-228+D	Th-228+D	1.000E+00	1.748E+00	1.214E+00	5.851E-01	4.545E-02	3.038E-05	1.264E-11
0Th-232	Th-232	1.000E+00	2.441E-02	2.425E-02	2.392E-02	2.278E-02	1.952E-02	1.300E-02
Th-232	Ra-228+D	1.000E+00	7.471E-02	2.095E-01	4.232E-01	8.055E-01	9.462E-01	7.956E-01
Th-232	Th-228+D	1.000E+00	1.336E-02	8.104E-02	3.140E-01	1.072E+00	1.482E+00	1.234E+00
Th-232	äDSR(j)		1.125E-01	3.148E-01	7.611E-01	1.901E+00	2.448E+00	2.043E+00
0U-235+D	U-235+D	1.000E+00	1.820E-01	1.739E-01	1.589E-01	1.158E-01	4.654E-02	7.091E-03
U-235+D	Pa-231	1.000E+00	6.572E-07	1.891E-06	4.021E-06	8.671E-06	9.705E-06	3.119E-06
U-235+D	Ac-227+D	1.000E+00	6.092E-08	3.988E-07	1.813E-06	9.583E-06	1.980E-05	8.243E-06
U-235+D	äDSR(j)		1.820E-01	1.739E-01	1.589E-01	1.158E-01	4.657E-02	7.102E-03
0U-238	U-238	5.400E-05	9.370E-08	8.905E-08	8.042E-08	5.622E-08	1.993E-08	2.279E-09
0U-238+D	U-238+D	9.999E-01	3.548E-02	3.388E-02	3.090E-02	2.236E-02	8.799E-03	1.279E-03
U-238+D	U-234	9.999E-01	2.826E-09	8.105E-09	1.711E-08	3.598E-08	3.726E-08	1.001E-08
U-238+D	Th-230	9.999E-01	2.130E-14	1.446E-13	7.133E-13	4.989E-12	2.114E-11	3.029E-11
U-238+D	Ra-226+D	9.999E-01	1.074E-15	1.567E-14	1.719E-13	3.648E-12	4.743E-11	1.688E-10
U-238+D	Pb-210+D	9.999E-01	5.158E-21	1.550E-19	3.644E-18	2.218E-16	7.746E-15	5.642E-14
U-238+D	äDSR(j)		3.548E-02	3.388E-02	3.090E-02	2.236E-02	8.799E-03	1.279E-03

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide

(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
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Np-237	9.321E+01	9.414E+01	9.603E+01	1.030E+02	1.270E+02	2.054E+02
Pu-239	3.894E+03	3.924E+03	3.986E+03	4.218E+03	5.029E+03	7.873E+03
Ra-226	1.063E+01	1.100E+01	1.178E+01	1.499E+01	3.016E+01	1.312E+02
Ra-228	1.636E+01	1.390E+01	1.353E+01	2.813E+01	5.776E+02	3.085E+05
Tc-99	8.185E+06	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10
Th-228	1.430E+01	2.060E+01	4.273E+01	5.500E+02	8.229E+05	1.978E+12
Th-232	2.223E+02	7.942E+01	3.285E+01	1.315E+01	1.021E+01	1.224E+01
U-235	1.374E+02	1.437E+02	1.573E+02	2.159E+02	5.369E+02	3.520E+03
U-238	7.047E+02	7.379E+02	8.091E+02	1.118E+03	2.841E+03	1.954E+04
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*At specific activity limit

0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide

(i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
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Np-237	1.660E+02	0.000E+00	2.682E-01	9.321E+01	2.682E-01	9.321E+01
Pu-239	1.370E-01	0.000E+00	6.420E-03	3.894E+03	6.420E-03	3.894E+03
Ra-226	8.980E-01	0.000E+00	2.352E+00	1.063E+01	2.352E+00	1.063E+01
Ra-228	3.220E+00	2.135 ñ 0.004	1.882E+00	1.328E+01	1.528E+00	1.636E+01
Tc-99	8.340E+02	0.000E+00	3.054E-06	8.185E+06	3.054E-06	8.185E+06
Th-228	3.220E+00	0.000E+00	1.748E+00	1.430E+01	1.748E+00	1.430E+01
Th-232	3.220E+00	27.00 ñ 0.05	2.454E+00	1.019E+01	1.125E-01	2.223E+02
U-235	3.200E+01	0.000E+00	1.820E-01	1.374E+02	1.820E-01	1.374E+02
U-238	9.020E+01	0.000E+00	3.548E-02	7.047E+02	3.548E-02	7.047E+02
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Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
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Np-237	Np-237	1.000E+00	4.452E+01	4.408E+01	4.322E+01	4.028E+01	3.268E+01	2.021E+01
0U-233	Np-237	1.000E+00	8.335E-07	2.430E-06	5.323E-06	1.279E-05	2.000E-05	1.386E-05
0Th-229	Np-237	1.000E+00	4.539E-09	3.125E-08	1.591E-07	1.248E-06	7.310E-06	1.935E-05
0Pu-239	Pu-239	1.000E+00	8.796E-04	8.728E-04	8.592E-04	8.120E-04	6.811E-04	4.350E-04
0U-235	Pu-239	1.000E+00	1.236E-11	3.632E-11	8.096E-11	2.074E-10	3.968E-10	4.415E-10
U-235	U-235	1.000E+00	5.822E+00	5.566E+00	5.085E+00	3.706E+00	1.489E+00	2.269E-01
U-235	äDOSE(j)		5.822E+00	5.566E+00	5.085E+00	3.706E+00	1.489E+00	2.269E-01
0Pa-231	Pu-239	1.000E+00	2.976E-17	2.026E-16	1.005E-15	7.189E-15	3.256E-14	5.415E-14
Pa-231	U-235	1.000E+00	2.103E-05	6.051E-05	1.287E-04	2.775E-04	3.105E-04	9.980E-05
Pa-231	äDOSE(j)		2.103E-05	6.051E-05	1.287E-04	2.775E-04	3.105E-04	9.980E-05
0Ac-227	Pu-239	1.000E+00	2.078E-18	2.963E-17	3.089E-16	5.528E-15	4.866E-14	1.082E-13
Ac-227	U-235	1.000E+00	1.949E-06	1.276E-05	5.803E-05	3.067E-04	6.337E-04	2.638E-04
Ac-227	äDOSE(j)		1.949E-06	1.276E-05	5.803E-05	3.067E-04	6.337E-04	2.638E-04
0Ra-226	Ra-226	1.000E+00	2.112E+00	2.041E+00	1.906E+00	1.497E+00	7.440E-01	1.709E-01
Ra-226	U-238	9.999E-01	9.689E-14	1.414E-12	1.551E-11	3.291E-10	4.278E-09	1.523E-08
Ra-226	äDOSE(j)		2.112E+00	2.041E+00	1.906E+00	1.497E+00	7.440E-01	1.709E-01
0Pb-210	Ra-226	1.000E+00	2.516E-05	7.256E-05	1.552E-04	3.421E-04	4.137E-04	1.675E-04
Pb-210	U-238	9.999E-01	4.652E-19	1.398E-17	3.287E-16	2.000E-14	6.987E-13	5.089E-12
Pb-210	äDOSE(j)		2.516E-05	7.256E-05	1.552E-04	3.421E-04	4.137E-04	1.675E-04
0Ra-228	Ra-228	1.000E+00	3.894E+00	3.337E+00	2.451E+00	8.317E-01	3.751E-02	7.102E-05
Ra-228	Th-232	1.000E+00	2.406E-01	6.746E-01	1.363E+00	2.594E+00	3.047E+00	2.562E+00
Ra-228	äDOSE(j)		4.135E+00	4.012E+00	3.814E+00	3.425E+00	3.084E+00	2.562E+00
0Th-228	Ra-228	1.000E+00	1.026E+00	2.455E+00	3.498E+00	2.030E+00	1.019E-01	1.899E-04
Th-228	Th-228	1.000E+00	5.629E+00	3.908E+00	1.884E+00	1.464E-01	9.782E-05	4.069E-11
Th-228	Th-232	1.000E+00	4.301E-02	2.610E-01	1.011E+00	3.453E+00	4.773E+00	3.974E+00
Th-228	äDOSE(j)		6.698E+00	6.624E+00	6.393E+00	5.629E+00	4.875E+00	3.974E+00
0Tc-99	Tc-99	1.000E+00	2.547E-03	7.854E-08	7.466E-17	0.000E+00	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	7.861E-02	7.808E-02	7.703E-02	7.335E-02	6.285E-02	4.187E-02
0U-238	U-238	5.400E-05	8.451E-06	8.032E-06	7.254E-06	5.071E-06	1.798E-06	2.056E-07
U-238	U-238	9.999E-01	3.200E+00	3.056E+00	2.787E+00	2.017E+00	7.937E-01	1.154E-01
U-238	äDOSE(j)		3.200E+00	3.056E+00	2.787E+00	2.017E+00	7.937E-01	1.154E-01
0U-234	U-238	9.999E-01	2.549E-07	7.310E-07	1.544E-06	3.246E-06	3.361E-06	9.033E-07
0Th-230	U-238	9.999E-01	1.921E-12	1.304E-11	6.434E-11	4.500E-10	1.907E-09	2.732E-09
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THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
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Np-237	Np-237	1.000E+00	1.660E+02	1.646E+02	1.618E+02	1.523E+02	1.282E+02	9.076E+01
0U-233	Np-237	1.000E+00	0.000E+00	7.070E-04	2.013E-03	5.602E-03	1.033E-02	1.022E-02
0Th-229	Np-237	1.000E+00	0.000E+00	3.368E-08	2.927E-07	2.885E-06	1.888E-05	5.936E-05
0Pu-239	Pu-239	1.000E+00	1.370E-01	1.368E-01	1.365E-01	1.354E-01	1.324E-01	1.265E-01
0U-235	Pu-239	1.000E+00	0.000E+00	1.319E-10	3.784E-10	1.084E-09	2.195E-09	2.748E-09
U-235	U-235	1.000E+00	3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
U-235	äS(j):		3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.385E-15	1.175E-14	1.064E-13	5.503E-13	1.139E-12
Pa-231	U-235	1.000E+00	0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
Pa-231	äS(j):		0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
0Ac-227	Pu-239	1.000E+00	0.000E+00	1.430E-17	3.446E-16	8.712E-15	8.892E-14	2.400E-13
Ac-227	U-235	1.000E+00	0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
Ac-227	äS(j):		0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
0Ra-226	Ra-226	1.000E+00	8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
Ra-226	U-238	9.999E-01	0.000E+00	1.613E-13	4.100E-12	1.233E-10	1.873E-09	8.260E-09
Ra-226	äS(j):		8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
0Pb-210	Ra-226	1.000E+00	0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
Pb-210	U-238	9.999E-01	0.000E+00	1.247E-15	9.427E-14	9.148E-12	3.788E-10	3.191E-09
Pb-210	äS(j):		0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
0Ra-228	Ra-228	1.000E+00	3.220E+00	2.765E+00	2.040E+00	7.029E-01	3.349E-02	7.603E-05
Ra-228	Th-232	1.000E+00	0.000E+00	3.601E-01	9.348E-01	1.993E+00	2.522E+00	2.544E+00
Ra-228	äS(j):		3.220E+00	3.125E+00	2.974E+00	2.696E+00	2.555E+00	2.544E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	9.037E-01	1.645E+00	1.064E+00	5.763E-02	1.311E-04
Th-228	Th-228	1.000E+00	3.220E+00	2.241E+00	1.086E+00	8.594E-02	6.121E-05	3.105E-11
Th-228	Th-232	1.000E+00	0.000E+00	5.940E-02	3.877E-01	1.639E+00	2.502E+00	2.544E+00
Th-228	äS(j):		3.220E+00	3.204E+00	3.118E+00	2.789E+00	2.560E+00	2.544E+00
0Tc-99	Tc-99	1.000E+00	8.340E+02	2.572E-02	2.445E-11	1.169E-42	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	3.220E+00	3.220E+00	3.220E+00	3.219E+00	3.216E+00	3.212E+00
0U-238	U-238	5.400E-05	4.871E-03	4.660E-03	4.265E-03	3.129E-03	1.291E-03	2.199E-04
U-238	U-238	9.999E-01	9.020E+01	8.629E+01	7.898E+01	5.794E+01	2.391E+01	4.072E+00
U-238	äS(j):		9.020E+01	8.630E+01	7.899E+01	5.794E+01	2.391E+01	4.072E+00
0U-234	U-238	9.999E-01	0.000E+00	2.446E-04	6.717E-04	1.643E-03	2.033E-03	8.080E-04
0Th-230	U-238	9.999E-01	0.000E+00	1.117E-09	9.485E-09	8.615E-08	4.498E-07	9.562E-07
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THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 14.35 seconds

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Dose Conversion Factor (and Related) Parameter Summary
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(2)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(3)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(4)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(5)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(6)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(7)
B-1	Tc-99	8.320E-06	8.320E-06	DCF2(8)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(9)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(10)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(11)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(12)
B-1	U-233	1.350E-01	1.350E-01	DCF2(13)
B-1	U-234	1.320E-01	1.320E-01	DCF2(14)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(15)
B-1	U-238	1.180E-01	1.180E-01	DCF2(16)
B-1	U-238+D	1.180E-01	1.180E-01	DCF2(17)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(2)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(3)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(4)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(5)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(6)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(7)
D-1	Tc-99	1.460E-06	1.460E-06	DCF3(8)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(9)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(10)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(11)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(12)
D-1	U-233	2.890E-04	2.890E-04	DCF3(13)
D-1	U-234	2.830E-04	2.830E-04	DCF3(14)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(15)
D-1	U-238	2.550E-04	2.550E-04	DCF3(16)
D-1	U-238+D	2.687E-04	2.550E-04	DCF3(17)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(2,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(2,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(2,3)
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(3,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(3,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(3,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

0 Menu	Parameter		Current Value	Base Case*	Parameter Name
D-34	Pb-210+D	, plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(4,1)
D-34	Pb-210+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(4,2)
D-34	Pb-210+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(4,3)
D-34					
D-34	Pu-239	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(5,1)
D-34	Pu-239	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(5,2)
D-34	Pu-239	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(5,3)
D-34					
D-34	Ra-226+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Ra-226+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,2)
D-34	Ra-226+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(6,3)
D-34					
D-34	Ra-228+D	, plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(7,1)
D-34	Ra-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,2)
D-34	Ra-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(7,3)
D-34					
D-34	Tc-99	, plant/soil concentration ratio, dimensionless	5.000E+00	5.000E+00	RTF(8,1)
D-34	Tc-99	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(8,2)
D-34	Tc-99	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(8,3)
D-34					
D-34	Th-228+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(9,1)
D-34	Th-228+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(9,2)
D-34	Th-228+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(9,3)
D-34					
D-34	Th-229+D	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(10,1)
D-34	Th-229+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(10,2)
D-34	Th-229+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(10,3)
D-34					
D-34	Th-230	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(11,1)
D-34	Th-230	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(11,2)
D-34	Th-230	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(11,3)
D-34					
D-34	Th-232	, plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(12,1)
D-34	Th-232	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(12,2)
D-34	Th-232	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34					
D-34	U-233	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(13,1)
D-34	U-233	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(13,2)
D-34	U-233	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(13,3)
D-34					
D-34	U-234	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(14,1)
D-34	U-234	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(14,2)
D-34	U-234	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(14,3)
D-34					
D-34	U-235+D	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(15,1)
D-34	U-235+D	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(15,2)
D-34	U-235+D	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(15,3)
D-34					
D-34	U-238	, plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(16,1)
D-34	U-238	, beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(16,2)
D-34	U-238	, milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(16,3)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-238+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(17,1)
D-34	U-238+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(17,2)
D-34	U-238+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(17,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(2,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(2,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(3,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(3,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(4,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(4,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(5,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(5,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(6,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(7,2)
D-5	Tc-99 , fish	2.000E+01	2.000E+01	BIOFAC(8,1)
D-5	Tc-99 , crustacea and mollusks	5.000E+00	5.000E+00	BIOFAC(8,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(9,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(9,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(10,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(10,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(11,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(12,2)
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(13,2)
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(14,2)
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(15,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(15,2)

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: FGR 13 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-238 , fish	1.000E+01	1.000E+01	BIOFAC(16,1)
D-5	U-238 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(16,2)
D-5				
D-5	U-238+D , fish	1.000E+01	1.000E+01	BIOFAC(17,1)
D-5	U-238+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(17,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Site-Specific Parameter Summary

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.000E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	1.500E-01	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	not used	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	2.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	1.000E+01	1.000E+01	---	T(4)
R011	Times for calculations (yr)	3.000E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	7.000E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	not used	3.000E+02	---	T(7)
R011	Times for calculations (yr)	not used	1.000E+03	---	T(8)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Np-237	1.660E+02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.370E-01	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Ra-226	8.980E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Ra-228	3.220E+00	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Tc-99	8.340E+02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): Th-228	3.220E+00	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): Th-232	3.220E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): U-235	3.200E+01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): U-238	9.020E+01	0.000E+00	---	S1(16)
R012	Concentration in groundwater (pCi/L): Np-237	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Ra-226	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Ra-228	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Tc-99	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): Th-228	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): Th-232	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): U-235	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): U-238	not used	0.000E+00	---	W1(16)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.500E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	2.000E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	1.000E+01	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	5.300E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	2.000E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	not used	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	5.000E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.000E+00	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	2.000E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	not used	1.000E+06	---	WAREA

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Accuracy for water/soil computations	not used	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	not used	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	not used	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	not used	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	not used	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	not used	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	not used	2.000E-02	---	HGWT
R014	Saturated zone b parameter	not used	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	not used	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	not used	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	not used	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	not used	2.500E+02	---	UW
R015	Number of unsaturated zone strata	not used	1	---	NS
R015	Unsat. zone 1, thickness (m)	not used	4.000E+00	---	H(1)
R015	Unsat. zone 1, soil density (g/cm**3)	not used	1.500E+00	---	DENSUZ(1)
R015	Unsat. zone 1, total porosity	not used	4.000E-01	---	TPUZ(1)
R015	Unsat. zone 1, effective porosity	not used	2.000E-01	---	EPUZ(1)
R015	Unsat. zone 1, field capacity	not used	2.000E-01	---	FCUZ(1)
R015	Unsat. zone 1, soil-specific b parameter	not used	5.300E+00	---	BUZ(1)
R015	Unsat. zone 1, hydraulic conductivity (m/yr)	not used	1.000E+01	---	HCUZ(1)
R016	Distribution coefficients for Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(2)
R016	Unsaturated zone 1 (cm**3/g)	not used	-1.000E+00	---	DCNUCU(2,1)
R016	Saturated zone (cm**3/g)	not used	-1.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.625E-03	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+03	2.000E+03	---	DCNUCC(5)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+03	---	DCNUCU(5,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.111E-03	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(6)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(6,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(7)
R016	Unsaturated zone 1 (cm**3/g)	not used	7.000E+01	---	DCNUCU(7,1)
R016	Saturated zone (cm**3/g)	not used	7.000E+01	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.165E-02	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Tc-99				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(8)
R016	Unsaturated zone 1 (cm**3/g)	not used	0.000E+00	---	DCNUCU(8,1)
R016	Saturated zone (cm**3/g)	not used	0.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.039E+01	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for Th-228				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(9)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(9,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for Th-232				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(12)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(12,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for U-235				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(15)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(15,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for U-238				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(16)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(16,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Unsaturated zone 1 (cm**3/g)	not used	2.000E+01	---	DCNUCU(1,1)
R016	Saturated zone (cm**3/g)	not used	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.099E-01	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(3)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(3,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(4)
R016	Unsaturated zone 1 (cm**3/g)	not used	1.000E+02	---	DCNUCU(4,1)
R016	Saturated zone (cm**3/g)	not used	1.000E+02	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.217E-02	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(10)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(10,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	6.000E+04	6.000E+04	---	DCNUCC(11)
R016	Unsaturated zone 1 (cm**3/g)	not used	6.000E+04	---	DCNUCU(11,1)
R016	Saturated zone (cm**3/g)	not used	6.000E+04	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	3.704E-05	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(13,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Unsaturated zone 1 (cm**3/g)	not used	5.000E+01	---	DCNUCU(14,1)
R016	Saturated zone (cm**3/g)	not used	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.426E-02	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R017	Inhalation rate (m**3/yr)	1.666E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	7.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	0.000E+00	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	4.000E-02	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	not used	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	not used	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	not used	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	not used	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	not used	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	not used	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	not used	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	not used	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	not used	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	not used	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	not used	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	not used	5.000E-01	---	FR9
R018	Contamination fraction of plant food	not used	-1	---	FPLANT
R018	Contamination fraction of meat	not used	-1	---	FMEAT
R018	Contamination fraction of milk	not used	-1	---	FMILK
R019	Livestock fodder intake for meat (kg/day)	not used	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	not used	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	not used	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	not used	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	not used	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	not used	1.000E-04	---	MLFD

Site-Specific Parameter Summary (continued)

0 Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	not used	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	not used	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	not used	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	not used	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	not used	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	not used	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	not used	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	not used	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	not used	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	not used	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	not used	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	not used	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	not used	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	not used	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	not used	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	not used	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	not used	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	not used	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	not used	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	not used	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	not used	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	not used	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	not used	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	not used	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	not used	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	not used	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	not used	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	17	---	---	LYMAX
TITL	Maximum number of integration points for risk	257	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	suppressed
4 -- meat ingestion	suppressed
5 -- milk ingestion	suppressed
6 -- aquatic foods	suppressed
7 -- drinking water	suppressed
8 -- soil ingestion	suppressed
9 -- radon	suppressed
Find peak pathway doses	active

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      Contaminated Zone Dimensions            Initial Soil Concentrations, pCi/g
      ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ            ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
        Area:  10000.00 square meters                 Np-237     1.660E+02
   Thickness:      0.15 meters                        Pu-239     1.370E-01
 Cover Depth:      0.00 meters                        Ra-226     8.980E-01
                                                      Ra-228     3.220E+00
                                                      Tc-99      8.340E+02
                                                      Th-228     3.220E+00
                                                      Th-232     3.220E+00
                                                      U-235      3.200E+01
                                                      U-238      9.020E+01
0
                         Total Dose TDOSE(t), mrem/yr
                    Basic Radiation Dose Limit = 2.500E+01 mrem/yr
   Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
   ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
    t (years):  0.000E+00  1.000E+00  3.000E+00  1.000E+01  3.000E+01  7.000E+01
     TDOSE(t):  1.012E+01  9.947E+00  9.616E+00  8.608E+00  6.656E+00  4.166E+00
         M(t):  4.046E-01  3.979E-01  3.846E-01  3.443E-01  2.662E-01  1.666E-01
0Maximum TDOSE(t):  1.012E+01 mrem/yr   at t = 0.000E+00 years
```

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	6.646E+00	0.6571	1.004E-01	0.0099	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.519E-06	0.0000	6.605E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	3.250E-01	0.0321	8.894E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	7.566E-01	0.0748	2.082E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	3.904E-04	0.0000	7.539E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	8.638E-01	0.0854	1.049E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	4.367E-02	0.0043	5.947E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	8.870E-01	0.0877	4.330E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.686E-01	0.0463	1.171E-02	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	9.991E+00	0.9878	1.237E-01	0.0122	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.747E+00	0.6670
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.757E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.250E-01	0.0321
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.568E-01	0.0748
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.911E-04	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.649E-01	0.0855
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.962E-02	0.0049
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.913E-01	0.0881
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.803E-01	0.0475
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E+01	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	6.582E+00	0.6617	9.884E-02	0.0099	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.516E-06	0.0000	6.553E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	3.140E-01	0.0316	9.231E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	8.902E-01	0.0895	4.701E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	1.204E-08	0.0000	2.309E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	5.998E-01	0.0603	7.254E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.439E-01	0.0145	5.949E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	8.479E-01	0.0852	4.116E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.476E-01	0.0450	1.113E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	9.826E+00	0.9878	1.213E-01	0.0122	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.681E+00	0.6717
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.705E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.140E-01	0.0316
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.907E-01	0.0895
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.206E-08	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.005E-01	0.0604
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.498E-01	0.0151
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.521E-01	0.0857
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.588E-01	0.0461
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.947E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	6.455E+00	0.6713	9.584E-02	0.0100	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.510E-06	0.0000	6.450E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.932E-01	0.0305	9.750E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	9.140E-01	0.0951	6.543E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	1.144E-17	0.0000	2.166E-20	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.891E-01	0.0301	3.467E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	3.648E-01	0.0379	6.010E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	7.749E-01	0.0806	3.719E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	4.084E-01	0.0425	1.005E-02	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	9.499E+00	0.9879	1.167E-01	0.0121	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.551E+00	0.6812
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.601E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.932E-01	0.0305
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.147E-01	0.0951
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.146E-17	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.895E-01	0.0301
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.709E-01	0.0386
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.786E-01	0.0810
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.185E-01	0.0435
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.616E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	6.024E+00	0.6998	8.591E-02	0.0100	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.489E-06	0.0000	6.093E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.304E-01	0.0268	1.035E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.395E-01	0.0511	3.658E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	2.246E-02	0.0026	2.613E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	9.290E-01	0.1079	6.166E-03	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	5.649E-01	0.0656	2.605E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	2.961E-01	0.0344	7.020E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	8.506E+00	0.9881	1.022E-01	0.0119	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.109E+00	0.7097
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.242E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.304E-01	0.0268
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.398E-01	0.0511
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.249E-02	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.352E-01	0.1086
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.675E-01	0.0659
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.031E-01	0.0352
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.608E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	4.903E+00	0.7366	6.193E-02	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.422E-06	0.0000	5.102E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	1.145E-01	0.0172	7.522E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	2.141E-02	0.0032	1.674E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	1.502E-05	0.0000	1.594E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.202E+00	0.1805	5.530E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	2.274E-01	0.0342	9.308E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.171E-01	0.0176	2.482E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	6.585E+00	0.9893	7.095E-02	0.0107	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.965E+00	0.7459
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.244E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.145E-01	0.0172
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.142E-02	0.0032
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.503E-05	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.207E+00	0.1814
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.283E-01	0.0343
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.196E-01	0.0180
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.656E+00	1.0000

0*Sum of all water independent and dependent pathways.

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	3.050E+00	0.7321	2.918E-02	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Pu-239	1.234E-06	0.0000	3.243E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	2.631E-02	0.0063	1.957E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	4.010E-05	0.0000	2.533E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	6.250E-12	0.0000	5.381E-15	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	1.005E+00	0.2411	3.683E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-235	3.475E-02	0.0083	1.079E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	1.719E-02	0.0041	2.812E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	4.133E+00	0.9920	3.329E-02	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio- Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.079E+00	0.7391
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.366E-05	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.631E-02	0.0063
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.012E-05	0.0000
Tc-99	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.255E-12	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.008E+00	0.2420
U-235	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.486E-02	0.0084
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.747E-02	0.0042
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.166E+00	1.0000

0*Sum of all water independent and dependent pathways.

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
Np-237+D	Np-237+D	1.000E+00	4.064E-02	4.025E-02	3.946E-02	3.680E-02	2.991E-02	1.855E-02
Np-237+D	U-233	1.000E+00	4.383E-10	1.279E-09	2.805E-09	6.772E-09	1.075E-08	7.758E-09
Np-237+D	Th-229+D	1.000E+00	4.037E-12	2.780E-11	1.416E-10	1.112E-09	6.542E-09	1.746E-08
Np-237+D	äDSR(j)		4.064E-02	4.025E-02	3.946E-02	3.680E-02	2.991E-02	1.855E-02
0Pu-239	Pu-239	1.000E+00	4.932E-04	4.894E-04	4.819E-04	4.556E-04	3.828E-04	2.457E-04
Pu-239	U-235+D	1.000E+00	1.381E-11	4.058E-11	9.047E-11	2.319E-10	4.437E-10	4.943E-10
Pu-239	Pa-231	1.000E+00	2.842E-17	1.936E-16	9.618E-16	6.910E-15	3.173E-14	5.426E-14
Pu-239	Ac-227+D	1.000E+00	2.129E-18	3.037E-17	3.169E-16	5.688E-15	5.051E-14	1.142E-13
Pu-239	äDSR(j)		4.932E-04	4.894E-04	4.819E-04	4.556E-04	3.828E-04	2.457E-04
0Ra-226+D	Ra-226+D	1.000E+00	3.619E-01	3.497E-01	3.265E-01	2.565E-01	1.275E-01	2.928E-02
Ra-226+D	Pb-210+D	1.000E+00	3.906E-06	1.127E-05	2.413E-05	5.340E-05	6.526E-05	2.701E-05
Ra-226+D	äDSR(j)		3.619E-01	3.497E-01	3.265E-01	2.566E-01	1.275E-01	2.930E-02
0Ra-228+D	Ra-228+D	1.000E+00	1.860E-01	1.595E-01	1.171E-01	3.973E-02	1.792E-03	3.393E-06
Ra-228+D	Th-228+D	1.000E+00	4.897E-02	1.171E-01	1.669E-01	9.686E-02	4.862E-03	9.067E-06
Ra-228+D	äDSR(j)		2.350E-01	2.766E-01	2.841E-01	1.366E-01	6.654E-03	1.246E-05
0Tc-99	Tc-99	1.000E+00	4.690E-07	1.446E-11	1.375E-20	0.000E+00	0.000E+00	0.000E+00
0Th-228+D	Th-228+D	1.000E+00	2.686E-01	1.865E-01	8.990E-02	6.984E-03	4.669E-06	1.943E-12
0Th-232	Th-232	1.000E+00	1.864E-03	1.852E-03	1.827E-03	1.740E-03	1.492E-03	9.971E-04
Th-232	Ra-228+D	1.000E+00	1.149E-02	3.223E-02	6.510E-02	1.239E-01	1.456E-01	1.224E-01
Th-232	Th-228+D	1.000E+00	2.052E-03	1.245E-02	4.825E-02	1.648E-01	2.278E-01	1.897E-01
Th-232	äDSR(j)		1.541E-02	4.654E-02	1.152E-01	2.904E-01	3.749E-01	3.131E-01
0U-235+D	U-235+D	1.000E+00	2.785E-02	2.663E-02	2.433E-02	1.773E-02	7.130E-03	1.088E-03
U-235+D	Pa-231	1.000E+00	8.597E-08	2.475E-07	5.270E-07	1.142E-06	1.296E-06	4.281E-07
U-235+D	Ac-227+D	1.000E+00	8.552E-09	5.600E-08	2.549E-07	1.351E-06	2.816E-06	1.192E-06
U-235+D	äDSR(j)		2.785E-02	2.663E-02	2.433E-02	1.774E-02	7.134E-03	1.089E-03
0U-238	U-238	5.400E-05	7.225E-09	6.867E-09	6.203E-09	4.340E-09	1.542E-09	1.780E-10
0U-238+D	U-238+D	9.999E-01	5.325E-03	5.086E-03	4.639E-03	3.360E-03	1.325E-03	1.936E-04
U-238+D	U-234	9.999E-01	2.254E-10	6.467E-10	1.366E-09	2.879E-09	3.005E-09	8.262E-10
U-238+D	Th-230	9.999E-01	1.715E-15	1.165E-14	5.750E-14	4.032E-13	1.723E-12	2.532E-12
U-238+D	Ra-226+D	9.999E-01	1.652E-16	2.411E-15	2.645E-14	5.613E-13	7.296E-12	2.597E-11
U-238+D	Pb-210+D	9.999E-01	7.192E-22	2.162E-20	5.089E-19	3.109E-17	1.097E-15	8.170E-15
U-238+D	äDSR(j)		5.325E-03	5.086E-03	4.639E-03	3.360E-03	1.325E-03	1.936E-04

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 2.500E+01 mrem/yr

0Nuclide

(i)	t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	6.151E+02	6.212E+02	6.335E+02	6.793E+02	8.359E+02	1.348E+03
Pu-239	5.069E+04	5.108E+04	5.188E+04	5.487E+04	6.531E+04	1.017E+05
Ra-226	6.908E+01	7.149E+01	7.656E+01	9.743E+01	1.960E+02	8.531E+02
Ra-228	1.064E+02	9.038E+01	8.801E+01	1.830E+02	3.757E+03	2.006E+06
Tc-99	5.331E+07	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10	*1.697E+10
Th-228	9.308E+01	1.341E+02	2.781E+02	3.579E+03	5.355E+06	1.287E+13
Th-232	1.622E+03	5.372E+02	2.171E+02	8.608E+01	6.669E+01	7.985E+01
U-235	8.975E+02	9.389E+02	1.027E+03	1.410E+03	3.504E+03	2.295E+04
U-238	4.695E+03	4.915E+03	5.389E+03	7.440E+03	1.886E+04	1.291E+05
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

*At specific activity limit

0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

0Nuclide

(i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	1.660E+02	0.000E+00	4.064E-02	6.151E+02	4.064E-02	6.151E+02
Pu-239	1.370E-01	0.000E+00	4.932E-04	5.069E+04	4.932E-04	5.069E+04
Ra-226	8.980E-01	0.000E+00	3.619E-01	6.908E+01	3.619E-01	6.908E+01
Ra-228	3.220E+00	2.131 ñ 0.004	2.894E-01	8.639E+01	2.350E-01	1.064E+02
Tc-99	8.340E+02	0.000E+00	4.690E-07	5.331E+07	4.690E-07	5.331E+07
Th-228	3.220E+00	0.000E+00	2.686E-01	9.308E+01	2.686E-01	9.308E+01
Th-232	3.220E+00	27.06 ñ 0.05	3.757E-01	6.655E+01	1.541E-02	1.622E+03
U-235	3.200E+01	0.000E+00	2.785E-02	8.975E+02	2.785E-02	8.975E+02
U-238	9.020E+01	0.000E+00	5.325E-03	4.695E+03	5.325E-03	4.695E+03
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	6.747E+00	6.681E+00	6.551E+00	6.109E+00	4.965E+00	3.079E+00
0U-233	Np-237	1.000E+00	7.276E-08	2.123E-07	4.656E-07	1.124E-06	1.785E-06	1.288E-06
0Th-229	Np-237	1.000E+00	6.702E-10	4.615E-09	2.351E-08	1.846E-07	1.086E-06	2.898E-06
0Pu-239	Pu-239	1.000E+00	6.757E-05	6.705E-05	6.601E-05	6.242E-05	5.244E-05	3.366E-05
0U-235	Pu-239	1.000E+00	1.892E-12	5.560E-12	1.239E-11	3.177E-11	6.079E-11	6.772E-11
U-235	U-235	1.000E+00	8.913E-01	8.521E-01	7.786E-01	5.674E-01	2.282E-01	3.480E-02
U-235	äDOSE(j)		8.913E-01	8.521E-01	7.786E-01	5.674E-01	2.282E-01	3.480E-02
0Pa-231	Pu-239	1.000E+00	3.893E-18	2.652E-17	1.318E-16	9.466E-16	4.347E-15	7.433E-15
Pa-231	U-235	1.000E+00	2.751E-06	7.919E-06	1.686E-05	3.654E-05	4.146E-05	1.370E-05
Pa-231	äDOSE(j)		2.751E-06	7.919E-06	1.686E-05	3.654E-05	4.146E-05	1.370E-05
0Ac-227	Pu-239	1.000E+00	2.917E-19	4.161E-18	4.342E-17	7.793E-16	6.920E-15	1.565E-14
Ac-227	U-235	1.000E+00	2.737E-07	1.792E-06	8.156E-06	4.323E-05	9.012E-05	3.815E-05
Ac-227	äDOSE(j)		2.737E-07	1.792E-06	8.156E-06	4.323E-05	9.012E-05	3.815E-05
0Ra-226	Ra-226	1.000E+00	3.250E-01	3.140E-01	2.932E-01	2.304E-01	1.145E-01	2.629E-02
Ra-226	U-238	9.999E-01	1.491E-14	2.175E-13	2.386E-12	5.062E-11	6.581E-10	2.342E-09
Ra-226	äDOSE(j)		3.250E-01	3.140E-01	2.932E-01	2.304E-01	1.145E-01	2.629E-02
0Pb-210	Ra-226	1.000E+00	3.508E-06	1.012E-05	2.167E-05	4.795E-05	5.860E-05	2.426E-05
Pb-210	U-238	9.999E-01	6.487E-20	1.950E-18	4.590E-17	2.804E-15	9.898E-14	7.370E-13
Pb-210	äDOSE(j)		3.508E-06	1.012E-05	2.167E-05	4.795E-05	5.860E-05	2.426E-05
0Ra-228	Ra-228	1.000E+00	5.991E-01	5.134E-01	3.771E-01	1.279E-01	5.771E-03	1.093E-05
Ra-228	Th-232	1.000E+00	3.701E-02	1.038E-01	2.096E-01	3.990E-01	4.687E-01	3.941E-01
Ra-228	äDOSE(j)		6.361E-01	6.172E-01	5.867E-01	5.270E-01	4.745E-01	3.941E-01
0Th-228	Ra-228	1.000E+00	1.577E-01	3.772E-01	5.376E-01	3.119E-01	1.565E-02	2.919E-05
Th-228	Th-228	1.000E+00	8.649E-01	6.005E-01	2.895E-01	2.249E-02	1.503E-05	6.255E-12
Th-228	Th-232	1.000E+00	6.609E-03	4.010E-02	1.554E-01	5.306E-01	7.336E-01	6.108E-01
Th-228	äDOSE(j)		1.029E+00	1.018E+00	9.824E-01	8.649E-01	7.492E-01	6.109E-01
0Tc-99	Tc-99	1.000E+00	3.911E-04	1.206E-08	1.146E-17	0.000E+00	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	6.003E-03	5.963E-03	5.883E-03	5.603E-03	4.805E-03	3.211E-03
0U-238	U-238	5.400E-05	6.517E-07	6.194E-07	5.596E-07	3.915E-07	1.391E-07	1.606E-08
U-238	U-238	9.999E-01	4.803E-01	4.588E-01	4.185E-01	3.031E-01	1.196E-01	1.747E-02
U-238	äDOSE(j)		4.803E-01	4.588E-01	4.185E-01	3.031E-01	1.196E-01	1.747E-02
0U-234	U-238	9.999E-01	2.033E-08	5.833E-08	1.233E-07	2.597E-07	2.710E-07	7.452E-08
0Th-230	U-238	9.999E-01	1.547E-13	1.051E-12	5.186E-12	3.637E-11	1.555E-10	2.284E-10
ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

0Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	7.000E+01
ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ	ÄÄÄÄÄÄÄÄÄÄ
Np-237	Np-237	1.000E+00	1.660E+02	1.646E+02	1.618E+02	1.523E+02	1.282E+02	9.076E+01
0U-233	Np-237	1.000E+00	0.000E+00	7.070E-04	2.013E-03	5.602E-03	1.033E-02	1.022E-02
0Th-229	Np-237	1.000E+00	0.000E+00	3.368E-08	2.927E-07	2.885E-06	1.888E-05	5.936E-05
0Pu-239	Pu-239	1.000E+00	1.370E-01	1.368E-01	1.365E-01	1.354E-01	1.324E-01	1.265E-01
0U-235	Pu-239	1.000E+00	0.000E+00	1.319E-10	3.784E-10	1.084E-09	2.195E-09	2.748E-09
U-235	U-235	1.000E+00	3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
U-235	äS(j):		3.200E+01	3.061E+01	2.802E+01	2.056E+01	8.483E+00	1.445E+00
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.385E-15	1.175E-14	1.064E-13	5.503E-13	1.139E-12
Pa-231	U-235	1.000E+00	0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
Pa-231	äS(j):		0.000E+00	6.477E-04	1.779E-03	4.349E-03	5.383E-03	2.138E-03
0Ac-227	Pu-239	1.000E+00	0.000E+00	1.430E-17	3.446E-16	8.712E-15	8.892E-14	2.400E-13
Ac-227	U-235	1.000E+00	0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
Ac-227	äS(j):		0.000E+00	9.984E-06	7.722E-05	5.129E-04	1.189E-03	5.959E-04
0Ra-226	Ra-226	1.000E+00	8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
Ra-226	U-238	9.999E-01	0.000E+00	1.613E-13	4.100E-12	1.233E-10	1.873E-09	8.260E-09
Ra-226	äS(j):		8.980E-01	8.696E-01	8.156E-01	6.515E-01	3.430E-01	9.505E-02
0Pb-210	Ra-226	1.000E+00	0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
Pb-210	U-238	9.999E-01	0.000E+00	1.247E-15	9.427E-14	9.148E-12	3.788E-10	3.191E-09
Pb-210	äS(j):		0.000E+00	2.675E-02	7.369E-02	1.825E-01	2.367E-01	1.078E-01
0Ra-228	Ra-228	1.000E+00	3.220E+00	2.765E+00	2.040E+00	7.029E-01	3.349E-02	7.603E-05
Ra-228	Th-232	1.000E+00	0.000E+00	3.601E-01	9.348E-01	1.993E+00	2.522E+00	2.544E+00
Ra-228	äS(j):		3.220E+00	3.125E+00	2.974E+00	2.696E+00	2.555E+00	2.544E+00
0Th-228	Ra-228	1.000E+00	0.000E+00	9.037E-01	1.645E+00	1.064E+00	5.763E-02	1.311E-04
Th-228	Th-228	1.000E+00	3.220E+00	2.241E+00	1.086E+00	8.594E-02	6.121E-05	3.105E-11
Th-228	Th-232	1.000E+00	0.000E+00	5.940E-02	3.877E-01	1.639E+00	2.502E+00	2.544E+00
Th-228	äS(j):		3.220E+00	3.204E+00	3.118E+00	2.789E+00	2.560E+00	2.544E+00
0Tc-99	Tc-99	1.000E+00	8.340E+02	2.572E-02	2.445E-11	1.169E-42	0.000E+00	0.000E+00
0Th-232	Th-232	1.000E+00	3.220E+00	3.220E+00	3.220E+00	3.219E+00	3.216E+00	3.212E+00
0U-238	U-238	5.400E-05	4.871E-03	4.660E-03	4.265E-03	3.129E-03	1.291E-03	2.199E-04
U-238	U-238	9.999E-01	9.020E+01	8.629E+01	7.898E+01	5.794E+01	2.391E+01	4.072E+00
U-238	äS(j):		9.020E+01	8.630E+01	7.899E+01	5.794E+01	2.391E+01	4.072E+00
0U-234	U-238	9.999E-01	0.000E+00	2.446E-04	6.717E-04	1.643E-03	2.033E-03	8.080E-04
0Th-230	U-238	9.999E-01	0.000E+00	1.117E-09	9.485E-09	8.615E-08	4.498E-07	9.562E-07
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍÍ

THF(i) is the thread fraction of the parent nuclide.
0RESCALC.EXE execution time = 18.44 seconds

Appendix G – Johnson-Ettinger Model Output

WORKSHEET 8.1 INDOOR AIR CALCULATION SUMMARY

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Medium: Overburden Groundwater

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation

Receptor: Resident Adult

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Cancer Risk unitless		Hazard Quotient unitless		Calculation Sheets	
		Basement	Slab	Basement	Slab	Basement	Slab
Arsenic	1.91E+01						
Lead	1.07E+01						
1,1-Dichloroethene	2.20E+02	NA	NA	8.98E-03	9.41E-03	8.5	8.12
cis-1,2-Dichloroethene	3.70E+03	NA	NA	2.23E-01	3.05E-01	8.6	8.13
trans-1,2-Dichloroethene	1.54E+02	NA	NA	8.48E-03	1.00E-02	8.7	8.14
Methylene chloride	2.63E+02	6.15E-08	9.32E-08	1.27E-04	1.92E-04	8.8	8.15
Tetrachloroethene	4.19E+03	3.82E-05	4.07E-05	3.15E-02	3.35E-02	8.9	8.16
Trichloroethene	3.74E+03	4.93E-04	5.66E-04	3.27E-01	3.75E-01	8.10	8.17
Vinyl Chloride	2.75E+02	8.56E-06	9.08E-06	2.84E-02	3.01E-02	8.11	8.18
Bis(2-ethylhexyl)phthalate	7.12E+00						
Total		5.40E-04	6.15E-04	6.28E-01	7.64E-01		

WORKSHEET 8.2 INDOOR AIR CALCULATION SUMMARY

Westinghouse Electric Co. Hematite Site

EPC Set: 1

Medium: Overburden Groundwater

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation

Receptor: Commercial/Industrial Worker

Chemical Constituent of Potential Concern	Groundwater Concentration ug/L	Cancer Risk unitless		Hazard Quotient unitless		Calculation Sheets	
		Basement	Slab	Basement	Slab	Basement	Slab
Arsenic	1.91E+01						
Lead	1.07E+01						
1,1-Dichloroethene	2.20E+02	NA	NA	6.41E-03	6.72E-03	8.19	8.26
cis-1,2-Dichloroethene	3.70E+03	NA	NA	1.60E-01	2.18E-01	8.20	8.27
trans-1,2-Dichloroethene	1.54E+02	NA	NA	8.48E-03	7.16E-03	8.21	8.28
Methylene chloride	2.63E+02	6.15E-08	6.93E-08	6.06E-03	1.37E-04	8.22	8.29
Tetrachloroethene	4.19E+03	2.84E-05	3.03E-05	2.25E-02	2.39E-02	8.23	8.30
Trichloroethene	3.74E+03	3.67E-04	4.21E-04	2.33E-01	2.68E-01	8.24	8.31
Vinyl Chloride	2.75E+02	6.37E-06	6.76E-06	2.03E-02	2.15E-02	8.25	8.32
Bis(2-ethylhexyl)phthalate	7.12E+00						
Total		4.02E-04	4.58E-04	4.57E-01	5.45E-01		

WORKSHEET 8.3 INDOOR AIR CALCULATION SUMMARY

Westinghouse Electric Co. Hematite Site

EPC Set: 5

Medium: Subsurface Soil

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation

Receptor: Resident Adult

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Cancer Risk unitless		Hazard Quotient unitless		Calculation Sheets	
		Basement	Slab	Basement	Slab	Basement	Slab
Arsenic	7.06E+00						
Lead	2.01E+01						
Tetrachloroethene	4.30E-01	9.64E-06	1.93E-05	7.94E-03	1.59E-02	8.33	8.35
Trichloroethene	5.94E-02	1.48E-05	2.96E-05	9.78E-03	1.96E-02	8.34	8.36
Total		2.44E-05	4.89E-05	1.77E-02	3.55E-02		

WORKSHEET 8.4 INDOOR AIR CALCULATION SUMMARY

Westinghouse Electric Co. Hematite Site

EPC Set: 5

Medium: Subsurface Soil

Exposure Medium: Indoor Air - Vapors

Exposure Route: Inhalation

Receptor: Commercial/Industrial Worker

Chemical Constituent of Potential Concern	Soil Concentration mg/kg	Cancer Risk unitless		Hazard Quotient unitless		Calculation Sheets	
		Basement	Slab	Basement	Slab	Basement	Slab
Arsenic	7.06E+00						
Lead	2.01E+01						
Tetrachloroethene	4.30E-01	7.17E-06	1.44E-05	5.67E-03	1.14E-02	8.37	8.39
Trichloroethene	5.94E-02	1.10E-05	2.20E-05	6.99E-03	1.40E-02	8.38	8.40
Total		1.82E-05	3.64E-05	1.27E-02	2.54E-02		

WORKSHEET 8.5A
DATA ENTRY

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	2.20E+02	1,1-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.5B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
9.00E-02	1.04E-05	2.60E-02	25	6,247	304.75	576.05	5.89E+01	2.25E+03	0.0E+00	2.0E-01

END

WORKSHEET 8.5C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	6,392	1.47E-02	6.33E-01	1.75E-04	7.02E-03	8.76E-06	5.80E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.39E+05	0.10	9.60E-01	7.02E-03	4.00E+02	3.05E+01	1.35E-05	1.87E+00	NA	2.0E-01

END

WORKSHEETS 8.5D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.25E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.0E-03

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.6A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	3.70E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.6B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

WORKSHEET 8.6C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,734	2.04E-03	8.77E-02	1.75E-04	5.74E-03	3.19E-05	2.06E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	3.25E+05	0.10	9.60E-01	5.74E-03	4.00E+02	6.52E+01	2.51E-05	8.16E+00	NA	3.5E-02

END

WORKSHEET 8.6D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.2E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.7A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	1.54E+02	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

WORKSHEET 8.7B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END

WORKSHEET 8.7C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,136	4.94E-03	2.13E-01	1.75E-04	5.52E-03	1.61E-05	1.06E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	3.28E+04	0.10	9.60E-01	5.52E-03	4.00E+02	7.74E+01	1.89E-05	6.19E-01	NA	7.0E-02

END

WORKSHEET 8.7D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	6.30E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.5E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.8A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	2.63E+02	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.8B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	4.7E-07	3.0E+00

END

WORKSHEET 8.8C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,034	1.16E-03	5.01E-02	1.75E-04	7.88E-03	5.59E-05	3.58E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.32E+04	0.10	9.60E-01	7.88E-03	4.00E+02	2.10E+01	3.02E-05	3.98E-01	4.7E-07	3.0E+00

END

WORKSHEET 8.8D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.30E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.2E-08	1.3E-04

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.9A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	4.19E+03	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.9B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

WORKSHEET 8.9C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	9.42E-06	6.22E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.41E+06	0.10	9.60E-01	5.62E-03	4.00E+02	7.16E+01	1.40E-05	1.97E+01	5.9E-06	6.0E-01

END

WORKSHEET 8.9D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.8E-05	3.1E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.10A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.74E+03	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.10B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

WORKSHEET 8.10C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	1.41E-05	9.26E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	7.69E+05	0.10	9.60E-01	6.16E-03	4.00E+02	4.90E+01	1.77E-05	1.36E+01	1.1E-04	4.0E-02

END

WORKSHEET 8.10D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.9E-04	3.3E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.11A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.75E+02	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.11B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01

END

WORKSHEET 8.11C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	5,000	1.72E-02	7.41E-01	1.75E-04	8.27E-03	9.73E-06	6.44E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.04E+05	0.10	9.60E-01	8.27E-03	4.00E+02	1.82E+01	1.45E-05	2.96E+00	8.8E-06	1.0E-01

END

WORKSHEET 8.11D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.6E-06	2.8E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.12A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	2.20E+02	1,1-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.12B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
9.00E-02	1.04E-05	2.60E-02	25	6,247	304.75	576.05	5.89E+01	2.25E+03	0.0E+00	2.0E-01

END

WORKSHEET 8.12C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	6,392	1.47E-02	6.33E-01	1.75E-04	7.02E-03	8.76E-06	1.11E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.39E+05	0.10	1.40E+00	7.02E-03	4.00E+02	1.44E+02	1.41E-05	1.96E+00	NA	2.0E-01

END

WORKSHEET 8.12D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.25E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.4E-03

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.13A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	3.70E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.13B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

WORKSHEET 8.13C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,734	2.04E-03	8.77E-02	1.75E-04	5.74E-03	3.19E-05	3.84E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	3.25E+05	0.10	1.40E+00	5.74E-03	4.00E+02	4.35E+02	3.44E-05	1.11E+01	NA	3.5E-02

END

WORKSHEET 8.13D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.1E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.14A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	1.54E+02	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

WORKSHEET 8.14B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END

WORKSHEET 8.14C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,136	4.94E-03	2.13E-01	1.75E-04	5.52E-03	1.61E-05	2.00E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	3.28E+04	0.10	1.40E+00	5.52E-03	4.00E+02	5.58E+02	2.23E-05	7.31E-01	NA	7.0E-02

END

WORKSHEET 8.14D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	6.30E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.0E-02

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.15A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	2.63E+02	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.15B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($(\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	4.7E-07	3.0E+00

END

WORKSHEET 8.15C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	7.88E-03	5.59E-05	6.61E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.32E+04	0.10	1.40E+00	7.88E-03	4.00E+02	8.36E+01	4.57E-05	6.03E-01	4.7E-07	3.0E+00

END

WORKSHEET 8.15D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.30E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.3E-08	1.9E-04

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.16A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	4.19E+03	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.16B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

WORKSHEET 8.16C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	9.42E-06	1.18E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.41E+06	0.10	1.40E+00	5.62E-03	4.00E+02	4.98E+02	1.49E-05	2.10E+01	5.9E-06	6.0E-01

END

WORKSHEET 8.16D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.1E-05	3.4E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.17A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.74E+03	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.17B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

WORKSHEET 8.17C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	1.41E-05	1.76E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	7.69E+05	0.10	1.40E+00	6.16E-03	4.00E+02	2.87E+02	2.03E-05	1.56E+01	1.1E-04	4.0E-02

END

WORKSHEET 8.17D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.7E-04	3.7E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.18A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.75E+02	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	24	24	350

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.18B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01

END

WORKSHEET 8.18C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	5,000	1.72E-02	7.41E-01	1.75E-04	8.27E-03	9.73E-06	1.23E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	2.04E+05	0.10	1.40E+00	8.27E-03	4.00E+02	6.80E+01	1.54E-05	3.14E+00	8.8E-06	1.0E-01

END

WORKSHEET 8.18D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.1E-06	3.0E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.19A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	2.20E+02	1,1-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.19B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
9.00E-02	1.04E-05	2.60E-02	25	6,247	304.75	576.05	5.89E+01	2.25E+03	0.0E+00	2.0E-01

END

WORKSHEET 8.19C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	6,392	1.47E-02	6.33E-01	1.75E-04	7.02E-03	8.76E-06	5.80E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.39E+05	0.10	9.60E-01	7.02E-03	4.00E+02	3.05E+01	1.35E-05	1.87E+00	NA	2.0E-01

END

WORKSHEET 8.19D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.25E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.4E-03

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.20A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	3.70E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.20B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

WORKSHEET 8.20C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,734	2.04E-03	8.77E-02	1.75E-04	5.74E-03	3.19E-05	2.06E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	3.25E+05	0.10	9.60E-01	5.74E-03	4.00E+02	6.52E+01	2.51E-05	8.16E+00	NA	3.5E-02

END

WORKSHEET 8.20D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.21A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	1.54E+02	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.21B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END

WORKSHEET 8.21C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,136	4.94E-03	2.13E-01	1.75E-04	5.52E-03	1.61E-05	1.06E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	3.28E+04	0.10	9.60E-01	5.52E-03	4.00E+02	7.74E+01	1.89E-05	6.19E-01	NA	7.0E-02

END

WORKSHEET 8.21D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	6.30E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.1E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.22A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	2.63E+02	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.22B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	4.7E-07	3.0E+00

END

WORKSHEET 8.22C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	7,034	1.16E-03	5.01E-02	1.75E-04	7.88E-03	5.59E-05	3.58E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.32E+04	0.10	9.60E-01	7.88E-03	4.00E+02	2.10E+01	3.02E-05	3.98E-01	4.7E-07	3.0E+00

END

WORKSHEET 8.22D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.30E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.6E-08	9.1E-05

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.23A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	4.19E+03	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.23B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

WORKSHEET 8.23C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	9.42E-06	6.22E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	1.41E+06	0.10	9.60E-01	5.62E-03	4.00E+02	7.16E+01	1.40E-05	1.97E+01	5.9E-06	6.0E-01

END

WORKSHEET 8.23D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.8E-05	2.2E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.24A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.74E+03	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.24B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

WORKSHEET 8.24C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	1.41E-05	9.26E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	7.69E+05	0.10	9.60E-01	6.16E-03	4.00E+02	4.90E+01	1.77E-05	1.36E+01	1.1E-04	4.0E-02

END

WORKSHEET 8.24D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.7E-04	2.3E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.25A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.75E+02	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
200	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.25B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01

END

WORKSHEET 8.25C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
2.54E+04	1.80E+06	2.22E-04	200	5,000	1.72E-02	7.41E-01	1.75E-04	8.27E-03	9.73E-06	6.44E-05

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	200	2.04E+05	0.10	9.60E-01	8.27E-03	4.00E+02	1.82E+01	1.45E-05	2.96E+00	8.8E-06	1.0E-01

END

WORKSHEET 8.25D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.4E-06	2.0E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.26A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	2.20E+02	1,1-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.26B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
9.00E-02	1.04E-05	2.60E-02	25	6,247	304.75	576.05	5.89E+01	2.25E+03	0.0E+00	2.0E-01

END

WORKSHEET 8.26C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	6,392	1.47E-02	6.33E-01	1.75E-04	7.02E-03	8.76E-06	1.11E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.39E+05	0.10	1.40E+00	7.02E-03	4.00E+02	1.44E+02	1.41E-05	1.96E+00	NA	2.0E-01

END

WORKSHEET 8.26D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	2.25E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.7E-03

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.27A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	3.70E+03	cis-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.27B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

WORKSHEET 8.27C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,734	2.04E-03	8.77E-02	1.75E-04	5.74E-03	3.19E-05	3.84E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	3.25E+05	0.10	1.40E+00	5.74E-03	4.00E+02	4.35E+02	3.44E-05	1.11E+01	NA	3.5E-02

END

WORKSHEET 8.27D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.2E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.28A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	1.54E+02	trans-1,2-Dichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.28B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.07E-02	1.19E-05	9.36E-03	25	6,717	320.85	516.50	5.25E+01	6.30E+03	0.0E+00	7.0E-02

END

WORKSHEET 8.28C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,136	4.94E-03	2.13E-01	1.75E-04	5.52E-03	1.61E-05	2.00E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	3.28E+04	0.10	1.40E+00	5.52E-03	4.00E+02	5.58E+02	2.23E-05	7.31E-01	NA	7.0E-02

END

WORKSHEET 8.28D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	6.30E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.2E-03

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.29A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75092	2.63E+02	Methylene chloride

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.29B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.01E-01	1.17E-05	2.18E-03	25	6,706	313.00	510.00	1.17E+01	1.30E+04	4.7E-07	3.0E+00

END

WORKSHEET 8.29C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	7,034	1.16E-03	5.01E-02	1.75E-04	7.88E-03	5.59E-05	6.61E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.32E+04	0.10	1.40E+00	7.88E-03	4.00E+02	8.36E+01	4.57E-05	6.03E-01	4.7E-07	3.0E+00

END

WORKSHEET 8.29D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.30E+07	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.9E-08	1.4E-04

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.30A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	4.19E+03	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

WORKSHEET 8.30B
CHEMICAL PROPERTIES SHEET

ABC

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01

END

WORKSHEET 8.30C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	9.42E-06	1.18E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	1.41E+06	0.10	1.40E+00	5.62E-03	4.00E+02	4.98E+02	1.49E-05	2.10E+01	5.9E-06	6.0E-01

END

WORKSHEET 8.30D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.0E-05	2.4E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.31A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	3.74E+03	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.31B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02

END

WORKSHEET 8.31C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	1.41E-05	1.76E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	7.69E+05	0.10	1.40E+00	6.16E-03	4.00E+02	2.87E+02	2.03E-05	1.56E+01	1.1E-04	4.0E-02

END

WORKSHEET 8.31D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.47E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
4.2E-04	2.7E-01

MESSAGE SUMMARY BELOW:

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

END

]

WORKSHEET 8.32A
DATA ENTRY SHEET

GW-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	2.75E+02	Vinyl chloride (chloroethene)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (^oC)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	400	SC	10	

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SIC			SIC	1.5	0.43	0.15

MORE ↓

ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
1.0E-06	1	70	25	25	250

Used to calculate risk-based groundwater concentration.

END

ABC

WORKSHEET 8.32B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm\text{-}m^3/mol$)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
1.06E-01	1.23E-05	2.69E-02	25	5,250	259.25	432.00	1.86E+01	8.80E+03	8.8E-06	1.0E-01

END

WORKSHEET 8.32C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	30.00	0.385	0.030	0.355	4,000

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)
1.69E+04	1.00E+06	4.00E-04	15	5,000	1.72E-02	7.41E-01	1.75E-04	8.27E-03	9.73E-06	1.23E-04

Diffusion path length, L_d (cm)	Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
385	15	2.04E+05	0.10	1.40E+00	8.27E-03	4.00E+02	6.80E+01	1.54E-05	3.14E+00	8.8E-06	1.0E-01

END

WORKSHEET 8.32D
RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	8.80E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
6.8E-06	2.1E-02

MESSAGE SUMMARY BELOW:

END

]

WORKSHEET 8.33A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	4.30E+02	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	24	24	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

WORKSHEET 8.33B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	

END

WORKSHEET 8.33C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	4.30E+02	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
200	9.30E-01	1.32E+05	0.10	9.60E-01	5.62E-03	4.00E+02	7.16E+01	3.76E-05	4.97E+00

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	6.0E-01

END

WORKSHEET 8.33D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.19E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.6E-06	7.9E-03

MESSAGE SUMMARY BELOW:

#REF!

END

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	5.94E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	24	24	350	1.0E-06	1

Used to calculate risk-based soil concentration.

END

CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02	X

END

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	5.94E+01	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
200	9.96E-01	1.08E+04	0.10	9.60E-01	6.16E-03	4.00E+02	4.90E+01	3.79E-05	4.08E-01

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-04	4.0E-02

END

WORKSHEET 8.34D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.5E-05	9.8E-03

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.35A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	4.30E+02	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	24	24	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

WORKSHEET 8.35B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	

END

WORKSHEET 8.35C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	4.30E+02	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	385

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	9.30E-01	1.32E+05	0.10	1.40E+00	5.62E-03	4.00E+02	4.98E+02	7.53E-05	9.96E+00

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	6.0E-01

END

WORKSHEET 8.35D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.19E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.9E-05	1.6E-02

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.36A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	5.94E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	24	24	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

WORKSHEET 8.36B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02	X

END

WORKSHEET 8.36C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	5.94E+01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	385

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	9.96E-01	1.08E+04	0.10	1.40E+00	6.16E-03	4.00E+02	2.87E+02	7.60E-05	8.19E-01

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-04	4.0E-02

END

WORKSHEET 8.36D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.0E-05	2.0E-02

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.37A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	4.30E+02	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

WORKSHEET 8.37B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	

END

WORKSHEET 8.37C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	4.30E+02	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
200	9.30E-01	1.32E+05	0.10	9.60E-01	5.62E-03	4.00E+02	7.16E+01	3.76E-05	4.97E+00

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	6.0E-01

END

WORKSHEET 8.37D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.19E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.2E-06	5.7E-03

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.38A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	5.94E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
200	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

WORKSHEET 8.38B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02	X

END

WORKSHEET 8.38C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
200	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	5.94E+01	2.54E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.80E+06	2.22E-04	200	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	200

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
200	9.96E-01	1.08E+04	0.10	9.60E-01	6.16E-03	4.00E+02	4.90E+01	3.79E-05	4.08E-01

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-04	4.0E-02

END

WORKSHEET 8.38D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.1E-05	7.0E-03

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.39A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	4.30E+02	Tetrachloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

WORKSHEET 8.39B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.9E-06	6.0E-01	

END

WORKSHEET 8.39C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	4.30E+02	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	5.62E-03	385

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	9.30E-01	1.32E+05	0.10	1.40E+00	5.62E-03	4.00E+02	4.98E+02	7.53E-05	9.96E+00

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
5.9E-06	6.0E-01

END

WORKSHEET 8.39D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.19E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.4E-05	1.1E-02

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.40A
DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	5.94E+01	Trichloroethylene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	400	10	SIC		

MORE ↓

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Vadose zone soil organic carbon fraction, f_{oc}^V (unitless)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
	1.5	0.43	0.15	0.006	

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

WORKSHEET 8.40B
CHEMICAL PROPERTIES SHEET

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (^oC)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B (^oK)	Critical temperature, T_C (^oK)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	Physical state at soil temperature, (S,L,G)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.47E+03	1.1E-04	4.0E-02	X

END

WORKSHEET 8.40C
INTERMEDIATE CALCULATIONS SHEET

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{rg} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (μg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
385	0.280	0.122	1.48E-09	0.937	1.39E-09	4,000	5.94E+01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	8,557	4.78E-03	2.06E-01	1.75E-04	6.16E-03	385

Convection path length, L_p (cm)	Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (μg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (μg/m^3)
15	9.96E-01	1.08E+04	0.10	1.40E+00	6.16E-03	4.00E+02	2.87E+02	7.60E-05	8.19E-01

Unit risk factor, URF (μg/m^3)$^{-1}$	Reference conc., RfC (mg/m^3)
1.1E-04	4.0E-02

END

WORKSHEET 8.40D
RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.67E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-05	1.4E-02

MESSAGE SUMMARY BELOW:

#REF!

END

WORKSHEET 8.41
VLOOKUP TABLES

Soil Properties Lookup Table

SCS Soil Type	K_s (cm/h)	α_1 (1/cm)	N (unitless)	M (unitless)	n (cm^3/cm^3)	θ_r (cm^3/cm^3)	Mean Grain Diameter (cm)	Bulk Density (g/cm^3)	θ_w (cm^3/cm^3)	SCS Soil Name
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	1.43	0.215	Clay
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	1.48	0.168	Clay Loam
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	1.59	0.148	Loam
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	1.62	0.076	Loamy Sand
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	1.66	0.054	Sand
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	1.63	0.197	Sandy Clay
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	1.63	0.146	Sandy Clay Loam
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	1.35	0.167	Silt
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	1.38	0.216	Silty Clay
SICL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	1.37	0.198	Silty Clay Loam
SIL	0.76	0.00506	1.663	0.3987	0.439	0.065	0.011	1.49	0.180	Silt Loam
SL	1.60	0.02667	1.449	0.3099	0.387	0.039	0.030	1.62	0.103	Sandy Loam

Chemical Properties Lookup Table

CAS No.	Chemical	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m^3/mol)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)	URF extrapolated (X)	RfC extrapolated (X)
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.24E+00	3.03E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00		
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04		
58899	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	7.30E+00	5.73E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	1.1E-03	X	X
60297	Ethyl ether	5.73E+00	7.82E-02	8.61E-06	5.68E+04	1.35E+00	3.29E-02	25	307.50	466.74	6,338	0.0E+00	7.0E-01		X
60571	Dieldrin	2.14E+04	1.25E-02	4.74E-06	1.95E-01	6.18E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	1.8E-04		X
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.87E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01		X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00		
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	3.5E-03		X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.79E+03	2.27E-01	5.54E-03	25	353.24	562.16	7,342	7.8E-06	3.0E-02		
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.03E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	2.2E+00		
72435	Methoxychlor	9.77E+04	1.56E-02	4.46E-06	1.00E-01	6.46E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02		X
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.59E-04	2.09E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	X	
74839	Methyl bromide	1.05E+01	7.28E-02	1.21E-05	1.52E+04	2.55E-01	6.22E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03		
74873	Methyl chloride (chloromethane)	2.12E+00	1.26E-01	6.50E-06	5.33E+03	3.61E-01	8.80E-03	25	249.00	416.25	5,115	1.0E-06	9.0E-02		
74908	Hydrogen cyanide	3.80E+00	1.93E-01	2.10E-05	1.00E+06	5.44E-03	1.33E-04	25	299.00	456.70	6,676	0.0E+00	3.0E-03		
74953	Methylene bromide	1.26E+01	4.30E-02	8.44E-06	1.19E+04	3.52E-02	8.59E-04	25	370.00	583.00	7,868	0.0E+00	3.5E-02		X
75003	Chloroethane (ethyl chloride)	4.40E+00	2.71E-01	1.15E-05	5.68E+03	3.61E-01	8.80E-03	25	285.30	460.40	5,879	8.3E-07	1.0E+01	X	
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	8.80E+03	1.10E+00	2.69E-02	25	259.25	432.00	5,250	8.8E-06	1.0E-01		
75058	Acetonitrile	4.20E+00	1.28E-01	1.66E-05	1.00E+06	1.42E-03	3.45E-05	25	354.60	545.50	7,110	0.0E+00	6.0E-02		
75070	Acetaldehyde	1.06E+00	1.24E-01	1.41E-05	1.00E+06	3.23E-03	7.87E-05	25	293.10	466.00	6,157	2.2E-06	9.0E-03		
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.96E-02	2.18E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00		
75150	Carbon disulfide	4.57E+01	1.04E-01	1.00E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01		
75218	Ethylene oxide	1.33E+00	1.04E-01	1.45E-05	3.04E+05	2.27E-02	5.54E-04	25	283.60	469.00	6,104	1.0E-04	0.0E+00		
75252	Bromoform	8.71E+01	1.49E-02	1.03E-05	3.10E+03	2.41E-02	5.88E-04	25	422.35	696.00	9,479	1.1E-06	7.0E-02		X
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.54E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	7.0E-02	X	X
75296	2-Chloropropane	9.14E+00	8.88E-02	1.01E-05	3.73E+03	5.93E-01	1.45E-02	25	308.70	485.00	6,286	0.0E+00	1.0E-01		
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01		
75354	1,1-Dichloroethylene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.60E-02	25	304.75	576.05	6,247	0.0E+00	2.0E-01		
75456	Chlorodifluoromethane	4.79E+01	1.01E-01	1.28E-05	2.00E+00	1.10E+00	2.70E-02	25	232.40	369.30	4,836	0.0E+00	5.0E+01		
75694	Trichlorofluoromethane	4.97E+02	8.70E-02	9.70E-06	1.10E+03	3.97E+00	9.68E-02	25	296.70	471.00	5,999	0.0E+00	7.0E-01		
75718	Dichlorodifluoromethane	4.57E+02	6.65E-02	9.92E-06	2.80E+02	1.40E+01	3.42E-01	25	243.20	384.95	9,421	0.0E+00	2.0E-01		
76131	1,1,2-Trichloro-1,2,2-trifluoroethane	1.11E+04	7.80E-02	8.20E-06	1.70E+02	1.97E+01	4.80E-01	25	320.70	487.30	6,463	0.0E+00	3.0E+01		
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	6.05E+01	1.48E+00	25	603.69	846.31	13,000	1.3E-03	1.8E-03		X
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.10E+00	2.69E-02	25	512.15	746.00	10,931	0.0E+00	2.0E-04		
78831	Isobutanol	2.59E+00	8.60E-02	9.30E-06	8.50E+04	4.83E-04	1.18E-05	25	381.04	547.78	10,936	0.0E+00	1.1E+00		X
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	8.73E-06	2.80E+03	1.15E-01	2.79E-03	25	369.52	572.00	7,590	1.9E-05	4.0E-03	X	
78933	Methylethylketone (2-butanone)	2.30E+00	8.08E-02	9.80E-06	2.23E+05	2.29E-03	5.58E-05	25	352.50	536.78	7,481	0.0E+00	5.0E+00		
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.73E-02	9.11E-04	25	386.15	602.00	8,322	1.6E-05	1.4E-02		X
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.47E+03	4.21E-01	1.03E-02	25	360.36	544.20	7,505	1.1E-04	4.0E-02	X	
79209	Methyl acetate	3.26E+00	1.04E-01	1.00E-05	2.00E+03	4.84E-03	1.18E-04	25	329.80	506.70	7,260	0.0E+00	3.5E+00		X
79345	1,1,2,2-Tetrachloroethane	9.33E+01	7.10E-02	7.90E-06	2.96E+03	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	2.1E-01		X
79469	2-Nitropropane	1.17E+01	9.23E-02	1.01E-05	1.70E+04	5.03E-03	1.23E-04	25	393.20	594.00	8,383	2.7E-03	2.0E-02		
80626	Methylmethacrylate	6.98E+00	7.70E-02	8.60E-06	1.50E+04	1.38E-02	3.36E-04	25	373.50	567.00	8,975	0.0E+00	7.0E-01		
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	3.57E+00	6.34E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01		X
86737	Fluorene	1.38E+04	3.63E-02	7.88E-06	1.98E+00	2.60E-03	6.34E-05	25	570.44	870.00	12,666	0.0E+00	1.4E-01		X
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	3.20E+00	3.33E-01	8.13E-03	25	486.15	738.00	10,206	2.2E-05	7.0E-04		X
88722	o-Nitrotoluene	3.24E+02	5.87E-02	8.67E-06	6.50E+02	5.11E-04	1.25E-05	25	495.00	720.00	12,239	0.0E+00	3.5E-02		X
91203	Naphthalene	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.82E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03		
91576	2-Methylnaphthalene	2.81E+03	5.22E-02	7.75E-06	2.46E+01	2.12E-02	5.17E-04	25	514.26	761.00	12,600	0.0E+00	7.0E-02		X
92524	Biphenyl	4.38E+03	4.04E-02	8.15E-06	7.45E+00	1.23E-02	2.99E-04	25	529.10	789.00	10,890	0.0E+00	1.8E-01		X
95476	o-Xylene	3.63E+02	8.70E-02	1.00E-05	1.78E+02	2.12E-01	5.18E-03	25	417.60	630.30	8,661	0.0E+00	1.0E-01		
95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.77E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01		

95578 2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02		X
95636 1,2,4-Trimethylbenzene	1.35E+03	6.06E-02	7.92E-06	5.70E+01	2.52E-01	6.14E-03	25	442.30	649.17	9,369	0.0E+00	6.0E-03		
96184 1,2,3-Trichloropropane	2.20E+01	7.10E-02	7.90E-06	1.75E+03	1.67E-02	4.08E-04	25	430.00	652.00	9,171	5.7E-04	4.9E-03	X	
96333 Methyl acrylate	4.53E+00	9.76E-02	1.02E-05	6.00E+04	7.68E-03	1.87E-04	25	353.70	536.00	7,749	0.0E+00	1.1E-01		X
97632 Ethylmethacrylate	2.95E+01	6.53E-02	8.37E-06	3.67E+03	3.44E-02	8.40E-04	25	390.00	571.00	10,957	0.0E+00	3.2E-01		X
98066 tert-Butylbenzene	7.71E+02	5.65E-02	8.02E-06	2.95E+01	4.87E-01	1.19E-02	25	442.10	1220.00	8,980	0.0E+00	1.4E-01		X
98828 Cumene	4.89E+02	6.50E-02	7.10E-06	6.13E+01	4.74E+01	1.46E-02	25	425.56	631.10	10,335	0.0E+00	4.0E-01		
98862 Acetophenone	5.77E+01	6.00E-02	8.73E-06	6.13E+03	4.38E-04	1.07E-05	25	475.00	709.50	11,732	0.0E+00	3.5E-01		X
98953 Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.82E-04	2.39E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03		
100414 Ethylbenzene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.22E-01	7.86E-03	25	409.34	617.20	8,501	0.0E+00	1.0E+00		
100425 Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.12E-01	2.74E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00		
100447 Benzylchloride	6.14E+01	7.50E-02	7.80E-06	5.25E+02	1.70E-02	4.14E-04	25	452.00	685.00	8,773	4.9E-05	0.0E+00	X	
100527 Benzaldehyde	4.59E+01	7.21E-02	9.07E-06	3.30E+03	9.73E-04	2.37E-05	25	452.00	695.00	11,658	0.0E+00	3.5E-01		X
103651 n-Propylbenzene	5.62E+02	6.01E-02	7.83E-06	6.00E+01	4.37E-01	1.07E-02	25	432.20	630.00	9,123	0.0E+00	1.4E-01		X
104518 n-Butylbenzene	1.11E+03	5.70E-02	8.12E-06	2.00E+00	5.38E-01	1.31E-02	25	456.46	660.50	9,290	0.0E+00	1.4E-01		X
106423 p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.13E-01	7.64E-03	25	411.52	616.20	8,525	0.0E+00	1.0E-01		
106467 1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.90E+01	9.82E-02	2.39E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01		
106934 1,2-Dibromoethane (ethylene dibromide)	2.50E+01	2.17E-02	1.19E-05	4.18E+03	3.04E-02	7.41E-04	25	404.60	583.00	8,310	2.2E-04	2.0E-04		
106990 1,3-Butadiene	1.91E+01	2.49E-01	1.08E-05	7.35E+02	3.01E+00	7.34E-02	25	268.60	425.00	5,370	3.0E-02	2.0E-03		
107028 Acrolein	2.76E+00	1.05E-01	1.22E-05	2.13E+05	4.99E-03	1.22E-04	25	325.60	506.00	6,731	0.0E+00	2.0E-05		
107062 1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.00E-02	9.77E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00		
107131 Acrylonitrile	5.90E+00	1.22E-01	1.34E-05	7.40E+04	4.21E-03	1.03E-04	25	350.30	519.00	7,786	6.8E-05	2.0E-03		
108054 Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.09E-02	5.10E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01		
108101 Methylisobutylketone (4-methyl-2-pentanone)	9.06E+00	7.50E-02	7.80E-06	1.90E+04	5.64E-03	1.38E-04	25	389.50	571.00	8,243	0.0E+00	3.0E+00		
108383 m-Xylene	4.07E+02	7.00E-02	7.80E-06	1.61E+02	3.00E-01	7.32E-03	25	412.27	617.05	8,523	0.0E+00	1.0E-01		
108678 1,3,5-Trimethylbenzene	1.35E+03	6.02E-02	8.67E-06	2.00E+00	2.41E-01	5.87E-03	25	437.89	637.25	9,321	0.0E+00	6.0E-03		
108872 Methylcyclohexane	7.85E+01	7.35E-02	8.52E-06	1.40E+01	4.22E+00	1.03E-01	25	373.90	572.20	7,474	0.0E+00	3.0E+00		
108883 Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.62E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01		
108907 Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.51E-01	3.69E-03	25	404.87	632.40	8,410	0.0E+00	6.0E-02		
109693 1-Chlorobutane	1.72E+01	8.26E-02	1.00E-05	1.10E+03	6.93E-01	1.69E-02	25	351.60	542.00	7,263	0.0E+00	1.4E+00		X
110009 Furan	1.86E+01	1.04E-01	1.22E-05	1.00E+04	2.21E-01	5.39E-03	25	304.60	490.20	6,477	0.0E+00	3.5E-03		X
110543 Hexane	4.34E+01	2.00E-01	7.77E-06	1.24E+01	6.82E+01	1.66E+00	25	341.70	508.00	6,895	0.0E+00	2.0E-01		
111444 Bis(2-chloroethyl)ether	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.36E-04	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00		
115297 Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.58E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02		X
118741 Hexachlorobenzene	5.50E+04	5.42E-02	5.91E-06	5.00E-03	5.40E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	2.8E-03		X
120821 1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	4.88E+01	5.81E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	4.0E-03		
123739 Crotonaldehyde (2-butenal)	4.82E+00	9.56E-02	1.07E-05	3.69E+04	7.99E-04	1.95E-05	25	375.20	568.00	9	5.4E-04	0.0E+00	X	
124481 Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.20E-02	7.81E-04	25	416.14	678.20	5,900	2.4E-05	7.0E-02	X	X
126987 Methacrylonitrile	3.58E+01	1.12E-01	1.32E-05	2.54E+04	1.01E-02	2.46E-04	25	363.30	554.00	7,600	0.0E+00	7.0E-04		
126998 2-Chloro-1,3-butadiene (chloroprene)	6.73E+01	8.58E-02	1.03E-05	2.12E+03	4.91E-01	1.20E-02	25	332.40	525.00	8,075	0.0E+00	7.0E-03		
127184 Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.53E-01	1.84E-02	25	394.40	620.20	8,288	5.9E-06	6.0E-01		
129000 Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E+00	4.50E-04	1.10E-05	25	667.95	936	14370	0.0E+00	1.1E-01		X
132649 Dibenzofuran	5.15E+03	2.38E-02	6.00E-06	3.10E+00	5.15E-04	1.26E-05	25	560	824	66400	0.0E+00	1.4E-02		X
135988 sec-Butylbenzene	9.66E+02	5.70E-02	8.12E-06	3.94E+00	5.68E-01	1.39E-02	25	446.5	679	88730	0.0E+00	1.4E-01		X
141786 Ethylacetate	6.44E+00	7.32E-02	9.70E-06	8.03E+04	5.64E-03	1.38E-04	25	350.26	523.3	7633.66	0.0E+00	3.2E+00		X
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	25	333.65	544	7192	0.0E+00	3.5E-02		X
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.84E-01	9.36E-03	25	320.85	516.5	6717	0.0E+00	7.0E-02		X
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.56E-06	1.50E-03	4.54E-03	1.11E-04	25	715.9	969.27	17000	2.1E-04	0.0E+00	X	
218019 Chrysene	3.98E+05	2.48E-02	6.21E-06	6.30E-03	3.87E-03	9.44E-05	25	714.15	979	16455	2.1E-06	0.0E+00	X	
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.70E-02	6.95E-03	1.70E-04	25	603.01	839.37	15000	4.9E-03	1.1E-04		X
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.34E-04	1.06E-05	25	596.55	839.36	15000	1.8E-03	0.0E+00		
541731 1,3-Dichlorobenzene	1.98E+03	6.92E-02	7.86E-06	1.34E+02	1.27E-01	3.09E-03	25	446	684	9230.18	0.0E+00	1.1E-01		X
542756 1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.24E-01	1.77E-02	25	381.15	587.38	7900	4.0E-06	2.0E-02		
630206 1,1,1,2-Tetrachloroethane	1.16E+02	7.10E-02	7.90E-06	1.10E+03	9.90E-02	2.41E-03	25	403.5	624	9768.282525	7.4E-06	1.1E-01		X
1634044 MTBE	7.26E+00	1.02E-01	1.05E-05	5.10E+04	2.56E-02	6.23E-04	25	328.3	497.1	6677.66	0.0E+00	3.0E+00		
7439976 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	2.00E+01	4.40E-01	1.07E-02	25	629.88	1750	14127	0.0E+00	3.0E-04		

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