FINAL
APPENDIX H

HUMAN HEALTH RISK ASSESSMENT
PECK IRON AND METAL
SUPERFUND SITE
PORTSMOUTH, VIRGINIA

Revision 01

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HydroGeoLogic, Inc

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LIST OF ACRONYMS AND ABBREVIATIONS

ACM	asbestos containing material
ALM	adult lead model
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
BLL	blood lead level
Ca	air concentration
CDC	Centers for Disease Control and Prevention
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	chemical of potential concern
Cr(VI)	hexavalent chromium
CSF	cancer slope factor
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ft	feet/foot
HGL	HydroGeoLogic, Inc.
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
IEUBK	Integrated Exposure Uptake Biokinetic
ILCR	incremental lifetime cancer risk
IUR	inhalation unit risk
µg/100 cm^2	micrograms per 100 square centimeters
µg/dL	micrograms per deciliter
µg/ft^2	micrograms per square feet
µg/L	micrograms per liter
m^3/kg	cubic meters per kilogram
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
NDC	Northwestern Drainage Channel
OSWER	Office of Solid Waste and Emergency Response

PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-*p*-dioxins
PCDF	polychlorinated dibenzofurans
PEF	particulate emission factor
PRG	preliminary remediation goal
Ra-226	radium-226
RAGS	Risk Assessment Guidance for Superfund
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
RL	reporting limit
RME	reasonable maximum exposure
RSL	Regional Screening Level
Site	Peck Iron and Metal Superfund Site
SVOC	semivolatile organic compound
TEQ	toxic equivalence
THQ	target hazard quotient
UCL	upper confidence limit
VDEQ	Virginia Department of Environmental Quality
VF	volatilization factor
VISL	Vapor Intrusion Screening Level
VOC	volatile organic compound

HUMAN HEALTH RISK ASSESSMENT
PECK IRON AND METAL SUPERFUND SITE
PORTSMOUTH, VIRGINIA

1.0 INTRODUCTION

This section presents the Human Health Risk Assessment (HHRA) for the Peck Iron and Metal Superfund Site (Site). The HHRA was completed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Oil and Hazardous Substances Contingency Plan, and their associated guidance documents (*Risk Assessment Guidance for Superfund* [RAGS]; Office of Solid Waste and Emergency Response [OSWER] Directives; etc.) and the *Interim Risk Assessment Deliverable* (HGL, 2017).

The dataset that was used in the HHRA (HHRA dataset) consisted of analytical data collected during the Remedial Investigation (RI) conducted from 2014 to 2016. Historical data collected prior to the RI were not used in the HHRA because the RI included sampling all of the Site's environmental media for all potential contaminants to provide a comprehensive characterization of current Site conditions.

The HHRA dataset includes surface soil, subsurface soil, sediment, surface water, groundwater, surface wipe, and biota tissue analytical data. A detailed description of RI sampling activities and collected sample media is presented in Section 3 of the RI Report. Depending on the medium and sampling event, RI samples were analyzed for a subset of metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), explosives, pesticides, polychlorinated biphenyls (PCBs) as Aroclors, PCB congeners, polychlorinated dibenzo-*p*-dioxins (PCDD)/ polychlorinated dibenzofurans (PCDF), and radionuclides, with the specific analytical suite depending on the medium and sampling event. Only validated data determined to be usable were included in the HHRA dataset.

Site groundwater was sampled quarterly for one year from September 2015 through June 2016. The analytical results of the four groundwater sampling events were combined into a single dataset for the HHRA. The entire dataset was screened to identify chemicals of potential concern (COPCs). As further described in Section 4.1, the analytical results for the groundwater COPCs were reviewed to assess the presence of hotspots. If a hotspot was identified, the exposure point concentration (EPC) was based on the hotspot data. Otherwise, the EPC was calculated from the entire dataset.

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2.0 POTENTIAL RECEPTORS AND EXPOSURE ROUTES

The Site is a mixture of developed and undeveloped land and currently contains three unoccupied buildings: a Brick Warehouse, a Maintenance Building, and the Shear Building (Figure 2.1). Parts of both the Brick Warehouse and Maintenance Building have collapsed. A recent structural assessment of the Brick Warehouse identified the potential for further collapse of this building (RI Report Appendix F.1). The Site abuts Paradise Creek, which provides habitat for fish and shellfish that people can consume. Based on current Site conditions and an unrestricted future land use, the individuals described below were identified as receptors.

Current Site Receptors

- Recreational user/fisherman (adult, adolescent, and child);
- Trespasser/visitor (adult, adolescent, and child);
- Fish consumer (child); and
- Cradock Community Resident (child, adult, and age-adjusted).

One tenant was observed operating within the facility over the course of RI field activities. The tenant appeared to use the Site for equipment and supply storage. The tenant's presence on Site was observed to be sporadic during the week as well as during the workday. Potential exposure of the current tenant to Site contaminants is captured through the recreational user and trespasser/visitor scenarios.

Future Site Receptors

- Recreational user/fisherman (adult, adolescent, and child);
- Trespasser/visitor (adult, adolescent, and child);
- Fish consumer (child);
- Outdoor maintenance worker (adult);
- Indoor worker (adult);
- Construction worker, default construction project (adult);
- Construction worker, dock construction project (adult);
- Utility worker (adult);
- Resident (child, adult, and age-adjusted); and
- Subsistence fisherman (child, adult, and age-adjusted).

Potentially contaminated Site media include surface soil, subsurface soil, sediment, surface water, and groundwater. Receptors can be exposed to contamination in these media through ingestion, dermal contact, and inhalation of volatile or fugitive dust emissions. Contaminants can bioaccumulate in fish or shellfish tissue which can then be consumed by people. The potentially complete exposure routes are listed below and summarized in Table 1 in Attachment A.

- Current/future recreational user/fisherman (child, adolescent, and adult): It is assumed that this individual catches fish and shellfish along Paradise Creek and brings the catch home for consumption. This individual can be exposed to contaminants in surface water and sediment while wading into the creek to catch fish and shellfish, and to contaminants in fish and shellfish tissue through consumption. This receptor can also be exposed to

contaminants in surface soil and the estuarine wetland while traversing the Site to reach the creek.

- Current/future trespasser/visitor (child, adult, and adolescent): It is assumed that this individual can be exposed to contaminants in surface soil (including fugitive dust emissions), surface water and sediment in the freshwater wetlands, and surface water and sediment in the estuarine wetlands along the creek and in the creek. This receptor could enter the on-Site buildings and be exposed to volatile contaminants that may have accumulated inside these buildings via the vapor intrusion pathway. This receptor does not fish.
- Current/future fish consumer (child): This individual represents a child who does not accompany the fisherman to the Site, but consumes fish brought home. Because this receptor's exposure, and thus risk, would be less than that estimated for the child recreational user/fisherman, the child fish consumer was not included in the quantitative assessment.
- Current Cradock Community resident (child, adult, and age-adjusted): This receptor represents current residents of the Cradock Community, located on the south side of Paradise Creek (Figure 2.1). During high water conditions, such as hurricanes, Paradise Creek sediment could be transported to and deposited on the yards of residences in the Cradock Community. Accordingly, this receptor is assumed to be exposed to a subset of Paradise Creek Estuarine Wetland sediment samples (only those sediment samples collected on the south side of Paradise Creek, specifically from locations PCWLSD01 through PCWLSD07).
- Future outdoor maintenance worker (adult): The outdoor maintenance worker is assumed to perform activities, such as landscaping or mowing, that could involve contact with Site soil. This receptor could be exposed to contaminants in future surface soil (i.e., current Site surface soil mixed with subsurface soil that may be turned over to the ground surface in the future [pooled data for surface and subsurface soil]).
- Indoor worker (adult): It is assumed that the indoor worker would spend most of his/her time inside a building, and thus could be exposed via inhalation to volatile contaminants that entered the building through the vapor intrusion pathway. This receptor would have minimal contact with the outdoor media such as soil, surface water, and sediment. This receptor would also have negligible exposure to fugitive dust; therefore, the soil-to-air exposure route was not quantified.
- Future construction worker, default construction project (adult): This receptor could be exposed to contaminants in surface soil and subsurface soil during excavation and other long-term construction projects. The exposure routes include inhalation of fugitive dusts and volatile compounds emitted during excavation and other intrusive activities. It is assumed that an excavation could extend to a depth of 12 feet (ft) below ground surface (bgs). The construction worker could also be exposed to volatile contaminants that have accumulated inside an excavation via the vapor intrusion pathway. Dewatering controls would be required to maintain excavation sidewall stability; therefore, it is unlikely that construction workers would contact contaminated groundwater. For this reason, incidental exposure of the construction worker to Site groundwater was not evaluated. In

addition, given that major construction projects are unlikely to encroach on wetlands or surface water bodies, it was assumed that the default construction worker would not be exposed to sediment or surface water.

- Future construction worker, dock construction project (adult): This receptor could be exposed to contaminants in surface water and sediment during dock construction activities. Because a dock would jut out into the creek, it is assumed that a dock construction worker would experience minimal exposure to Site soil. It is unlikely that a construction worker would spend much time in a trench or excavation for a dock construction. For this reason, inhalation of vapors and direct contact with groundwater were identified as incomplete exposure pathways for this receptor.
- Future utility worker (adult): This receptor could be exposed to contaminants in surface water, sediment, surface soil, subsurface soil, and fugitive dusts/volatile emissions during trenching activities. Similar to the construction worker, it is assumed that a utility trench could extend to 12 ft bgs. The utility worker could also be exposed to volatile contaminants that have accumulated inside an excavation through vapor intrusion. Because temporary trenches are less likely to be subject to dewatering than a large excavation, direct contact with groundwater is included as a potentially complete pathway for this receptor.
- Future resident (child, adult, and age-adjusted): It is assumed that the Site could be redeveloped for residential use. The hypothetical future resident could be exposed to contaminants in future surface soil (represented by both the surface soil dataset and pooled surface and subsurface soil datasets), and surface water and sediment in the freshwater wetlands, estuarine wetlands, and Paradise Creek. Exposure to soil includes potential inhalation of fugitive dust and volatile emissions. In addition, it is assumed that the future resident uses the shallow groundwater as a potable water supply and catches fish and shellfish for personal consumption. Finally, the vapor intrusion pathway was evaluated for the future resident.
- Future subsistence fisherman (child, adult, and age-adjusted): It is assumed that this individual catches fish and shellfish along Paradise Creek, brings the catch home for consumption, and acquires the majority of their calories from fishing activities at the Site. This individual can be exposed to contaminants in surface water and sediment while wading into the creek to catch fish and shellfish, and to contaminants in fish and shellfish tissue through consumption.

In the absence of intrusive activities, there is limited potential for receptors to be exposed to subsurface soil. Future construction activities could bring subsurface soil to the ground surface and mix it with the surface soil. For this reason, it was assumed that future surface soil would be a mixture of surface soil and subsurface soil. Typical excavations do not extend deeper than 10 to 12 ft bgs. The soil dataset includes samples from a maximum depth of 12 ft bgs. Accordingly, data from all soil samples were used in the HHRA.

Sediment at the Site is assumed to have an elevated moisture content given its proximity to surface water bodies. However, the inhalation pathway could be complete if sediments become dry. Exposure to fugitive dust and volatile emissions emanating from sediment was included in the evaluation of the future utility worker and future construction worker (dock project). The potential

for inhalation risks to be overestimated if sediment remains moist is discussed in the uncertainty section (Section 7.3). The sediment and surface water exposure pathways are incomplete for the outdoor maintenance worker and construction worker (default project), as these receptors are not anticipated to have work duties (e.g., mowing, building, etc.) in wetland areas or other surface water bodies.

Site groundwater is not currently used as a potable water supply. In the absence of land use controls, it is possible that a water supply well could be installed in the future. For this reason, the use of groundwater for drinking water was included in the evaluation for the future resident receptor.

Three structures are present at the Site:

- Brick Warehouse, a 54,204-square foot slab-on-grade, brick structure;
- Maintenance Building, a 3,312-square foot slab-on-grade, cinderblock building; and
- Shear Building, a 828-square foot cinderblock building with attached concrete pad in the central section of the Site.

The Brick Warehouse has holes in the roof and is partially burnt, but central portions of the building can and have been used by trespassers and sealed in a manner to allow vapor accumulation. The Maintenance Building is open on the southern and eastern sides and is unlikely to accumulate vapors. The Shear Building could accumulate vapors. None of the structures is regularly occupied and all three are to be demolished before the Site is reused. Based on potential use by trespassers, the vapor intrusion exposure pathway was identified as complete for the current trespasser/visitor.

Based on the presence of VOCs in soil and groundwater, the vapor intrusion pathway is identified as a potentially complete exposure pathway if a new building were constructed under future land use. As shown in Table 1 (Attachment 1.A), the vapor intrusion pathway was evaluated for the future trespasser/visitor, future resident, and future indoor worker. In addition, exposure of a construction worker (default project) and utility worker to volatile contaminants that accumulate in an excavation or trench was evaluated. Several buildings are present on adjacent properties within 100 ft of the Site. The vapor intrusion exposure pathway may be complete for these buildings; therefore, this off-site exposure pathway was qualitatively evaluated in this HHRA (Section 6.6).

The three buildings were inspected for asbestos-containing material (ACM). Six samples of friable building materials were collected from the Brick Warehouse and analyzed for ACM. Friable material was not observed in the other two structures. One sample, BWABS01, contained 35% asbestos. Asbestos was not detected in the remaining five samples. ACM poses a risk to human health through inhalation. Asbestos was also detected in 15 of the 57 soil samples submitted for ACM. Asbestos percentages ranged from 1% to 13% in the 15 soil samples. The 15 soil samples were collected at depths of 0 to 0.5 ft bgs, 0.5 to 2 ft bgs, 2 to 4 ft bgs, and 4 to 8 ft bgs. Asbestos was not detected in the other 42 soil samples. As long as the ACM is undisturbed, and its fibers are not airborne, the inhalation exposure route is incomplete. If an individual can cause the ACM to become airborne, however, the exposure route is potentially complete. Currently, there are no

controls to prevent ACM at the Site from becoming airborne. EPA identified a threshold of 1% asbestos for determining whether a response action should be taken to address ACM (https://www.epa.gov/superfund/asbestos-superfund-sites). OSWER Directive 9345.4-05 notes that asbestos concentrations less than 1% could also pose a risk to human health depending on site-specific conditions. The result for BWABS01 is greater than 1%, confirming the potential for ACM at the Site to pose a risk to human health.

The HHRA dataset includes wipe samples collected from surfaces within the Brick Warehouse. Sampled surfaces included locations typically contacted by authorized personnel and trespassers, including table tops, doors and walls at hand height, and walkways/flooring. Samples were analyzed for PCBs and lead. The HHRA evaluated the wipe sample data to assess potential risks to the current trespasser/visitor receptor. Authorized personnel that access the Site include the Site owner and/or designees. Authorized personnel are expected to access the Site a few times per year and the associated exposure is expected to be consistent with that of the trespasser/visitor. Because the on-Site buildings are to be demolished before the Site is re-purposed, contact with the building surfaces is not a complete exposure route for future Site receptors and was not evaluated in the HHRA.

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3.0 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

To focus the HHRA on chemicals that could pose a health risk, the data were screened to select the COPCs. Chemical COPCs were identified by comparing the maximum detections to the most current versions of the screening values listed below. The selection of COPCs is presented in Tables 2.1 through 2.21 (Attachment A).

- Non-radionuclides:
  - Surface and subsurface soil: residential soil Regional Screening Levels (RSLs) (cancer risk = 1.0×10^{-6} [10^{-6}]; non-cancer target hazard quotient [THQ] = 0.1).
  - Sediment: residential soil RSLs (cancer risk = 10^{-6}; non-cancer THQ = 0.1) multiplied by 10 (in other words, the sediment screening values are 10 times the soil screening values and represent a cancer risk of 10^{-5} and non-cancer THQ of 1.0 under a residential soil exposure scenario). Using screening values for sediment that are 10 times those for soil is appropriate because exposure to sediment is less than one-tenth of that for soil due to the lower exposure frequency associated with sediment as compared to soil.
  - Ambient air for the soil-to-air inhalation pathway: this screening was conducted separately only for individuals engaged in excavation activities (construction workers and utility worker). The estimated ambient air concentrations were compared to the industrial air RSLs (cancer risk = 10^{-6}; non-cancer THQ = 0.1).
  - Surface water: The screening value for surface water is the lower of the Virginia Water Quality Standard or the tap water RSL (cancer risk = 10^{-6}; non-cancer THQ = 0.1) multiplied by 10. In other words, the surface water screening values are 10 times the tap water screening values and represent a cancer risk of 10^{-5} and non-cancer THQ of 1.0 under a drinking water scenario. Similar to sediment, the adjustment applied to the tap water RSL is appropriate because surface water exposure is less than one-tenth the exposure associated with potable water use.
  - Groundwater: tap water RSLs (cancer risk = 10^{-6}; non-cancer THQ = 0.1).
  - Oyster and fish tissue: screening values were calculated using the U.S. Environmental Protection Agency (EPA) RSL calculator (available at https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search) with a target cancer risk of 10^{-6} and target non-cancer THQ of 0.1.
- Radionuclides, all media: screening values were calculated using the EPA's preliminary remediation goal (PRG) calculator for radionuclides, which is available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search. Soil and groundwater screening values were calculated for a target risk of 10^{-6}. For surface water and sediment, the groundwater and soil screening values were multiplied by 10 to account for the reduced exposure to these media. In other words, the radionuclide screening values for surface water and sediment are concentrations corresponding to a cancer risk of 10^{-5} for a residential exposure scenario (i.e., exposure frequency of 350 days per year, exposure duration of 26 years, etc.). Documentation supporting the PRG calculations is included in Attachment B.

For a given analyte in a given medium, if the maximum detected concentration was greater than the appropriate screening value, the chemical was identified as a COPC for that medium. Analytes not detected in any of the samples for a particular medium were not identified as COPCs. The essential nutrients calcium, magnesium, potassium, and sodium were not identified as COPCs. The selection of COPCs is presented in Tables 2.1 through 2.21 (Attachment A).

The residential soil RSLs account for the soil-to-air pathway under a residential land use. Construction workers (default project) and utility workers, however, can be exposed to more inhaled contaminants than residents because of the dust generated during excavation activities. To account for this exposure route, a separate soil-to-air screening was performed for the construction worker and utility worker. For this screening, potential ambient air concentrations were estimated with the equation below, which was obtained from Section 5 of *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA, 2002). The maximum estimated air concentration was compared to the EPA industrial air RSL (November 2017) (cancer risk = 10^{-6}, non-cancer THQ = 0.1). If the maximum estimated air concentration exceeded the industrial air RSL, the chemical was identified as a COPC for inhalation by the construction worker (default project), construction worker (dock project), and/or utility worker. This screening is presented in Table 2.3 (soil), Table 2.5 (non-tidal Freshwater Wetland sediment), and Table 2.7 (Estuarine Wetland sediment), Table 2.10 (Northwestern Drainage Channel [NDC] sediment), and Table 2.13 (Paradise Creek sediment).

$$C_a = C_s \times (1/PEF + 1/VF)$$

Where: C_a = ambient air EPC (milligrams per cubic meter [mg/m^3])
C_s = soil EPC (milligrams per kilogram [mg/kg])
PEF = particulate emissions factor (cubic meters per kilogram [m^3/kg])
VF = volatilization factor (m^3/kg)

The construction worker (default project) and utility worker PEFs and VFs were calculated in accordance with EPA (2002) and are presented in Tables 2.3a, 2.3b, 2.5a, 2.5b, 2.7a, 2.7b, 2.10a, 2.10b, 2.13a, and 2.13b. The PEF calculation for the utility worker assumed that excavated portions of the trench would be backfilled as the project progressed (i.e., the entire trench would not remain open for the duration of the project). Specifically, it was assumed that a 100 ft linear segment of a 16 ft wide trench would be open at any given time during the project. The utility trench PEFs were also used for the dock construction project, which is expected to require minimal excavation.

The current EPA residential soil RSL for lead, 400 mg/kg, is based on a target blood lead level (BLL) of 10 micrograms per deciliter (µg/dL). This reference value had been established by the Centers for Disease Control and Prevention (CDC) to be protective of a child receptor. Based on a growing body of studies concluding that BLLs less than 10 µg/dL have adverse effects on the health of children, the CDC lowered the BLL reference value to 5 µg/dL in January 2014. To ensure that potential risks associated with exposure to lead concentrations in soil less than 400 mg/kg, a screening value of 200 mg/kg was used. This screening value reflects a target BLL of approximately 5 µg/dL. As described above, sediment data were screened against 10 times the soil

value based on a limited relative exposure. Accordingly, sediment lead data were screened against 2,000 mg/kg.

To evaluate potential risks associated with the vapor intrusion exposure pathway for indoor air, groundwater data were compared to residential screening values obtained from EPA's Vapor Intrusion Screening Level (VISL) calculator (Version 3.5, June 2017). This screening is presented in Table 2.18.

For intrusion of vapors into an excavation that intersects the water table, all chemicals detected in groundwater samples and identified as sufficiently volatile and sufficiently toxic in OSWER *Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air* (EPA, 2015) were screened against Virginia Department of Environmental Quality (VDEQ) Tier III Groundwater Screening Levels (Table 2.13 of the Virginia Risk Assessment Guidance, 9 VAC 20-160-70(A)(1)(a)). This screening is presented in Table 2.19.

Sport fish tissue samples were not collected during the field investigation. The investigation included collection of mummichog tissue samples from Paradise Creek. The approach described below was used to estimate sport fish tissue concentrations from the HHRA data. The screening of the estimated sport fish tissue concentrations is presented in Table 2.15.

- The mummichog tissue data were reviewed to identify which bioaccumulative chemicals were detected in the tissue samples. Bioaccumulative chemicals are defined in Table 4-2 of *Bioaccumulation Testing and Interpretation for the Purpose of Sediment Quality Assessment* (EPA, 2000).
    - For those bioaccumulative chemicals detected in the mummichog tissue samples, sport fish tissue concentrations were estimated using sediment and surface water data combined with biota-sediment accumulation factors and bioconcentration factors obtained from the literature. For each bioaccumulative chemical, the greater of the mummichog tissue detection or the estimated sport fish tissue concentrations was used for comparison to the fish RSLs.
    - For non-bioaccumulative chemicals detected in the mummichog tissue samples, the tissue data were used as surrogates for sport fish tissue concentrations and the maximum detections were compared to the fish RSLs.

The mummichog and oyster tissue samples were not analyzed for radionuclides. To evaluate potential exposure of people to radionuclides in fish and shellfish tissue, the following approach was used:

- Maximum sediment concentrations were used to estimate maximum shellfish tissue concentrations. The biota-sediment accumulation factor for lead was used to calculate tissue concentrations of lead-212 and lead-214. For the other radionuclides detected in the sediment samples, a default biota-sediment accumulation factor of 1 was used.

- Maximum sediment and surface water detections were multiplied by biota-sediment accumulation factors and bioconcentration factors to estimate sport fish tissue concentrations.
- The maximum estimated tissue concentrations were compared to screening values obtained from the EPA PRG calculator to select COPCs.

The oyster and mummichog samples were not speciated for hexavalent chromium (Cr[VI]). For the oyster samples, the maximum total chromium detection was used as the maximum Cr(VI) concentration. The maximum Cr(VI) concentration in sport fish tissue was estimated from the Cr(VI) results for sediment and surface water.

There are no standard equations for assessing exposure to PCBs and lead on indoor surfaces (i.e., wipe samples). As shown in Table 2.20 of Attachment A, the PCB wipe results were compared to the criterion for unrestricted use of non-porous surfaces listed in 40 Code of Federal Regulations 761.79(b)(3)(i)(A), which is 10 micrograms per 100 square centimeters (µg/100 cm^2). The lead results were compared to the lowest of the U.S. Department of Housing and Urban Development clearance standards (Section 15, Table 15.2) (40 micrograms per square foot [µg/ft^2] for floors) for lead-based paint abatement listed in the 2012 *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*. Based on exceedances of these screening values, Aroclor 1248, Aroclor 1260, and lead were retained as COPCs for building surfaces/wipe samples. Potential risks associated with current exposure to indoor building surfaces are discussed further in Section 4.

4.0 EXPOSURE QUANTIFICATION

4.1 CALCULATION OF EXPOSURE POINT CONCENTRATIONS

For COPCs with eight or more detections, a 95% upper confidence limit (UCL) of the mean was calculated using EPA's ProUCL (Version 5.1.00) and used as the EPC. For nondetect results or results qualified as blank contamination, the limit of detection was entered into the ProUCL input file and the result was identified as a nondetect. For COPCs with fewer than eight detections, the maximum detected concentration was identified as the EPC. The EPCs are presented in Tables 3.1 through 3.21 (Attachment A). ProUCL outputs are included as Attachment C.

During the calculation of 95% UCLs, the following approach was applied to parent sample/field duplicate pairs:

- If both samples have detections, the results were averaged to provide a single value for the sample location.
- If only one sample has a detection, the detection was used as the value for the sample location.
- If both results are nondetect, the lowest limit of detection was used as the value for the sample location.

The ambient air concentrations associated with volatile and fugitive dust emissions generated by non-excavation and excavation activities were modeled in accordance with the approach described in Section 3 and provided in the *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (EPA, 2002).

As stated in Section 1, the groundwater COPC screening (Table 2.17 in Attachment A) used the entire 2015 - 2016 dataset. The analytical results for the COPCs were reviewed to assess whether each COPC was present as a plume with a core or whether groundwater concentrations were relatively uniform across the Site. Radium-226 (Ra-226) is the only COPC that appears to have an area of relatively high concentrations that could be considered a plume core. Accordingly, the EPCs for all COPCs except Ra-226 were based on the entire groundwater dataset. A hotspot of Ra-226 contamination is present around monitoring wells MW04 and MW20. For this COPC, the maximum detection was used as the EPC.

For COPCs identified in Table 2.19, the Virginia construction trench model was used to estimate concentrations of volatile groundwater contaminants in an excavation that intersects the groundwater, as presented in Table 3.20. Exposure to volatile compounds while showering was evaluated using the Foster and Chrostowski shower model (Foster and Chrostowski, 1986).

As noted in Section 3, sport fish tissue samples were not collected, and the oyster samples were not analyzed for all potential contaminants. The following approach was used to estimate EPCs for the fish and shellfish COPCs.

- Shellfish: For COPCs included in the oyster samples analytical suites, the EPCs were obtained from the tissue data. It was assumed that all chromium was in the hexavalent

form. For radionuclides, the oyster tissue concentrations were estimated from the Paradise Creek sediment EPCs used biota-sediment accumulation factors.

- Sport fish:
  - Radionuclide EPCs were estimated from the Paradise Creek sediment and surface water EPCs.
  - The Cr(VI) EPC was estimated from the Cr(VI) concentrations in sediment and surface water.
  - For COPCs detected in the mummichog tissue samples, the EPC was the higher of the mummichog tissue data versus tissue concentrations estimated from sediment and surface water EPCs.

4.2 EXPOSURE ASSUMPTIONS

Exposure was quantified in accordance with the EPA guidance. All exposure assumptions (ingestion rate, exposure duration, etc.) for the potentially complete exposure pathways are presented in Tables 4.1 through 4.35 (Attachment A).

5.0 TOXICITY ASSESSMENT

Toxicity values, summarized in Tables 5.1, 5.2, 6.1, and 6.2, (e.g., reference doses, reference concentrations, cancer slope factors, and inhalation unit risks) were obtained from various sources, EPA and non-EPA, in accordance with the hierarchy outlined in OSWER Directive 9285.7-53. If a value could not be found in any of the sources listed in this OSWER Directive, the value listed in the RSL tables was used. Dermal reference doses and cancer slope factors were estimated from oral values in accordance with RAGS Part E, *Supplemental Guidance for Dermal Risk Assessment* (EPA, 2004a). Tables 5.1, 5.2, 6.1, and 6.2 have also been included in Attachment A.

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6.0 RISK CHARACTERIZATION

Risk characterization combines the results of the previous elements of the risk assessment to evaluate the potential health risks associated with exposure to the COPCs. The risk characterization is then used as an integral component in the site risk management and remedial decision making.

6.1 METHODS FOR ESTIMATING RISKS

Potential human health risks from exposure to chemicals are discussed independently for carcinogenic and noncarcinogenic effects because of the different toxicological endpoints, relevant exposure duration, and methods used to characterize risk. Exposure to some constituents (e.g., arsenic) may result in both noncarcinogenic and carcinogenic effects, and therefore, these constituents were evaluated in both groups.

6.1.1 Carcinogenic Risk and Noncarcinogenic Hazard Estimation

For a given receptor, cancer risks were calculated for each COPC within each exposure medium, summed across each exposure medium, and summed across all exposure media. The cancer risk calculations incorporated age-dependent adjustment factors for mutagenic chemicals. Inhalation cancer risks were calculated in accordance with RAGS Part F, *Supplemental Guidance for Inhalation Risk Assessment* (EPA, 2009d). The equations for calculating the cancer risk are:

(chemical ingestion or dermal contact) ILCR = Intake (mg/kg/day) x CSF $(mg/kg/day)^{-1}$

Where: ILCR = incremental lifetime cancer risk
CSF = cancer slope factor

(chemical inhalation) ILCR = Ca (mg/m^3) x IUR $(mg/m^3)^{-1}$

Where: Ca = concentration in air adjusted for exposure time
IUR = inhalation unit risk

(radionuclide ingestion, external exposure, or inhalation) ILCR = EPC x 10^{-6}/PRG

For radionuclides, the PRGs were based on a target risk of 10^{-6} and exposure assumptions specific to each receptor and exposure medium. The PRGs are provided in Attachment B.

The HQ estimated for each COPC was summed across each exposure medium and all exposure media to provide a total hazard index (HI) for each receptor. For any HI exceeding the target level of 1 (rounded to one significant figure), a target organ analysis was performed in order to account for differences in toxic mechanisms among the COPCs. Inhalation hazards were calculated in accordance with RAGS Part F (EPA, 2009d). The equations for calculating the HQs are:

(ingestion and dermal contact) HQ = Intake (mg/kg/day) / RfD (mg/kg/day)

Where: HQ = hazard quotient
RfD = reference dose

(inhalation) HQ = Ca (mg/m^3) / RfC (mg/m^3)

Where: Ca = air concentration adjusted for exposure time
RfC = reference concentration

6.1.2 Blood Lead Modeling

Lead health-protective target concentrations are less than 0.015 milligrams per liter (mg/L) for potable use of groundwater and surface water (the Safe Drinking Water Act action level for lead in potable water; EPA, 2009) and less than 400 mg/kg in soil and sediment (EPA, 1994a). The current EPA residential soil RSL, 400 mg/kg, is based on a target BLL of 10 µg/dL. This reference value had been established by the CDC to be protective of a child receptor. Based on a growing body of studies concluding that BLLs less than 10 µg/dL have adverse effects on the health of children, the CDC lowered the BLL reference value to 5 µg/dL in January 2014. Based on this new information, this HHRA used 5 µg/dL as the target BLL.

Lead was retained as a COPC for surface soil, total soil, groundwater, sediment (Estuarine Wetland only), surface water (NDC only), fish tissue, and shellfish tissue. Lead does not have published toxicity factors, and therefore, potential risks associated with lead are evaluated differently from the other COPCs. Lead toxicity is primarily evaluated by EPA with a physiologically-based, pharmacokinetic model called the Integrated Exposure Uptake Biokinetic (IEUBK) model.

The potential risks associated with exposure to lead by the current/future child trespasser/visitor/recreational user/fisherman, future child resident, and future child subsistence fisherman were evaluated using the IEUBK lead model for Windows, Version 1.1, Build 11 (EPA, 2010). The IEUBK model provides predictions of the probability of elevated BLLs for children ages 0 to 7 years from potential exposure to lead in various media. This model addresses three components of environmental risk assessments: (1) the multimedia nature of exposures to lead, (2) lead pharmacokinetics, and (3) significant variability in exposure and risk (through estimation of probability distributions of BLLs for children exposed to similar environmental concentrations). The IEUBK model was used to evaluate potential risks associated with childhood exposure to lead in soil, groundwater, shellfish, and fish. The arithmetic means of the lead concentrations in these media were used as EPCs, as presented in Tables 3.1 through 3.21 (Attachment A). The model default input parameters were used to represent site-specific exposures to lead in soil, groundwater, and fish tissue (using the higher of the fish/shellfish EPCs). For non-residential receptors, soil ingestion rates were modified to account for reduced exposure frequency relative to a residential scenario. For fish ingestion, the percent of fish ingested from the site was assumed to be 25% for the current/future child recreational user, 25% for the future resident, and 100% for the future child subsistence fisherman.

IEUBK was developed to model exposure to lead in soil, water, and diet, and does not include a component for lead in sediment. To evaluate this exposure medium, the average lead concentration in Estuarine Wetland sediment (276.2 mg/kg) was entered as the soil concentration and the soil (sediment) ingestion rates were modified to account for the sediment exposure frequency (60 days) relative to the default residential exposure frequency within IEUBK (365 days). Site-specific concentrations (EPCs) were inputted for fish and/or groundwater, where applicable. All remaining soil exposure assumptions were unchanged.

IEUBK was also used to evaluate potential risks to the current child resident of Cradock Community. As described in Section 2, this receptor represents current residents of the Cradock Community, located south of the Site on the south side of Paradise Creek. It is possible for Site soil to migrate to the Cradock Community during flooding and storms. To evaluate a child who lives in this community, the average lead concentration in Cradock Community sediment (117.1 mg/kg) was used as the soil concentration and evaluated with standard default soil exposure assumptions.

The IEUBK model results are expressed as the predicted geometric mean BLL for children and the percent of the population potentially experiencing concentrations greater than the target BLL, which in this case was 5 µg/dL. The target is for less than 5 percent of the population to have a BLL greater than 5 µg/dL.

An interim approach to assessing risks associated with adult exposures to lead was developed by EPA's Technical Review Workgroup for Lead (EPA, 2003b) and updated in 2005 and 2009 (EPA, 2009). This methodology is a variation of the IEUBK model. The Adult Lead Model (ALM) is used to evaluate risks associated with non-residential adult exposures to lead in soil. The model focuses on estimating fetal BLLs in women exposed to lead in soil (EPA, 2003b). The ALM was used in the HHRA to evaluate potential risks to the future outdoor maintenance worker, current/future trespasser/visitor/recreational user/fisherman, future construction worker (default project), future utility worker, and future resident. Because the lead model is a probabilistic model, several EPA default parameters are based on central tendency (i.e., average) values (EPA, 2003b). Therefore, the arithmetic mean lead concentrations for soil served as the EPC within the ALM, as presented in Tables 3.1 and 3.2 in Attachment A. The site-specific exposure assumptions (e.g., ingestion rates and exposure durations) presented in Table 4.1 through 4.35 (Attachment A) were used in the ALM, as applicable.

The IEUBK and ALM models are not directly suited to assess potential risks to lead in surface water. For this medium, potential risks associated with exposure to lead were qualitatively evaluated based on comparison of the analytical results to the lead action level (15 micrograms per liter [µg/L]).

6.2 RISK ASSESSMENT RESULTS

Initially, cancer risks and non-cancer hazards were calculated for all COPCs, including COPCs determined to be present at concentrations consistent with background or anthropogenic conditions. The risk calculations for all COPCs are presented in Tables 7.1 through 7.85 and Tables 8.1 through 8.78, and summarized in Tables 9.1 through 9.29 (Attachment A).

To distinguish Site-related risks and hazards from background risks and hazards, the cumulative cancer risks, total HIs, and target organ HIs were recalculated excluding those COPCs determined to be present due to background conditions (RI Report Section 5 and Appendix G). The risk totals for site-related COPCs are summarized in Tables 9.30 through 9.58 in Attachment A.

Cumulative cancer risks associated with site-related COPCs were compared to the EPA target risk range of 10^{-6} to 10^{-4}. Target organ HIs for site-related COPCs were compared to a target value of 1. For each receptor with a risk greater than target risk levels, risk drivers were identified. The risk

drivers are those site-related COPCs that contribute a reasonable maximum exposure (RME) HI greater than 0.1 to a cumulative target organ HI that exceeds 1, or a carcinogenic risk greater than 10^{-6} to a cumulative carcinogenic risk that exceeds 10^{-4}.

Total estimated cancer risk and non-cancer HI for exposure of the future indoor worker and current adult resident in the Cradock community to site-related COPCs were less than target levels. Unacceptable risks are not indicated for these receptors. For all other receptors, the total estimated cancer risk and/or non-cancer HI from exposure to site-related COPCs exceed target levels. Risk drivers for each receptor are summarized in Table 6.1 and are presented in detail in Tables 10.1 through 10.26 in Attachment A).

6.3 LEAD RESULTS

Lead was identified as a COPC in site surface soil, total soil, sediment (Estuarine Wetland only), surface water (NDC only), groundwater, fish tissue, and shellfish tissue. Lead was evaluated as described in Section 6.1.2. The results of the lead evaluation are presented below.

6.3.1 Soil

As described in Section 6.1.2, potential risks associated with exposure to lead were evaluated using the IEUBK model for children and the ALM for adults. The IEUBK model results are expressed as the predicted geometric mean BLL for children and the percent of the population potentially experiencing concentrations above a specified BLL. For this HHRA, the target for lead is less than 5 percent of the population exceeding 5 µg/dL BLL. A summary of the IEUBK results is presented below. IEUBK output files are provided in Attachment D.

Receptor	IEUBK Result Percent of Population > 5 µg/dL	IEUBK Result Predicted Geometric Mean BLL (µg/dL)
Current Child Trespasser/Visitor/ Recreational User/Fisherman	**97.1%**	**12.1**
Future Child Trespasser/Visitor/ Recreational User/Fisherman	**95.2%**	**11.0**
Future Child Resident	**99.7%**	**18.2**
Future Child Resident (Surface Soil Only)	**99.9%**	**23.0**

As shown above, the percent of the population with an estimated BLL exceeding (shown as bolded) µg/dL exceeds the target level (5 percent) for all receptors. Lead is retained as a risk driver for site surface soil, total soil, groundwater, shellfish tissue, and fish tissue.

The ALM evaluation is presented in Tables 7.73 through 7.77 in Attachment A. A comparison of protective soil concentrations and EPCs for each of the receptors is presented below.

Receptor	ALM Protective Concentration (mg/kg)	Applicable EPC (mg/kg)
Current Trespasser/Visitor/ Recreational User/Fisherman	4,110	2,793
Future Trespasser/Visitor/ Recreational User/Fisherman	4,110	1,614
Future Outdoor Maintenance Worker	**1,130**	**1,614**
Future Resident	**704**	**1,614**
Future Construction Worker (Default Project)	**281**	**1,614**
Future Utility Worker	3,080	1,614

Note: bold text indicates soil concentration greater than protective concentration.

As shown above, the average lead concentration detected in soil exceeds the protective concentration for the future outdoor maintenance worker, future resident, and future construction worker (default project). Lead is retained as a risk driver for these receptors.

The IEUBK model is applicable to children and the ALM is to adults, but neither is directly applicable to adolescent receptors (ages 9 to 18). The results of both models, however, indicate the potential for adolescents also to experience adverse effects from exposure to lead in Site soil.

6.3.2 Sediment

IEUBK was developed to model exposure to lead in soil, water, and diet, and does not include a component for lead in sediment. As described in Section 6.1.2, to evaluate this exposure medium, the average lead concentration in Estuarine Wetland sediment (276.2 mg/kg) was entered as the soil concentration and the soil (sediment) ingestion rates were modified to account for the sediment exposure frequency (60 days) relative to the default residential exposure frequency within IEUBK (365 days). Site-specific concentrations (EPCs) were inputted for fish and/or groundwater, where applicable. All remaining soil exposure assumptions were unchanged. A summary of the IEUBK results is presented below. IEUBK output files are provided in Attachment D.

Receptor	IEUBK Result Percent of Population > 5 µg/dL	IEUBK Result Predicted Geometric Mean BLL (µg/dL)
Current/Future Trespasser/Visitor/ Recreational User/Fisherman	**91.5%**	**9.53**
Future Resident	**91.9%**	**9.63**
Future Subsistence Fisherman	**99.9%**	**24.3**

As shown above, the percent of the population with an estimated BLL exceeding (shown as bolded) 5 µg/dL exceeds the target level (5 percent) for all receptors evaluated. Lead is retained as a risk driver for Estuarine Wetland sediment.

The ALM evaluation for lead in Estuarine Wetland sediment is presented in Tables 7.78 through 7.81 of Attachment A. As shown below, lead is not retained as a risk driver for the adult receptors shown below.

Receptor	ALM Protective Concentration (mg/kg)	Applicable EPC (mg/kg)
Current/Future Trespasser/Visitor/ Recreational User/Fisherman	4,110	276.2
Future Resident	4,110	276.2
Future Construction Worker (Dock Project)	685	276.2
Future Utility Worker	3,080	276.2

The IEUBK results for the current child Cradock Community resident are shown below. For this exposure scenario, the average lead concentration in Cradock Community sediment (117.1 mg/kg) was entered as the soil concentration and modeled under a soil exposure scenario. IEUBK output files are provided in Attachment D. As shown below, potential lead concentrations at the Cradock Community result in acceptable BLLs.

Receptor	IEUBK Result Percent of Population > 5 µg/dL	IEUBK Result Predicted Geometric Mean BLL (µg/dL)
Current Cradock Community Resident	2.34%	1.96

6.3.3 Surface Water

Lead was identified as a COPC for surface water in the NDC. As shown in Table 2.11 (Attachment A), only two surface water samples were collected from the NDC. Lead was detected in both samples at concentrations of 5.9 micrograms per liter (µg/L) and 18.2 µg/L, with the latter result, from sample location NASW02, exceeding the Maximum Contaminant Level (MCL) of 15 µg/L. The MCL is protective of exposure through a drinking water scenario. Surface water at the Site is unlikely to be used as a source of drinking water. The most likely exposure scenario for surface water in the NDC is incidental contact during recreational use of the Site. A recreational user would experience a much lower degree of exposure than someone using the water as a drinking water supply. Based on the low ratio by which the MCL is exceeded and the relatively limited exposure associated with the NDC surface water, it is unlikely that lead in the NDC surface water poses a risk to human health. Lead was not identified as a risk driver for this exposure medium.

6.3.4 Summary

In summary, lead was identified as a COPC in surface soil, total soil, groundwater, Estuarine Wetland sediment, NDC surface water, fish tissue, and shellfish tissue. Lead was not identified as a COPC for NDC sediment, Paradise Creek sediment, Estuarine Wetland surface water, or Paradise Creek surface water. BLLs associated with exposure of a child to lead in site soil or sediment, groundwater, and biota tissue were estimated with IEUBK. The ALM was used to evaluate exposure of adults to lead in Site soil and sediment. Based on the modeling results, lead in surface soil, total soil, groundwater, Estuarine Wetland sediment, fish tissue, and shellfish tissue was identified as a risk driver.

6.4 WIPE SAMPLES

Based on exceedances of these screening values, Aroclor 1248, Aroclor 1260, and lead were identified as COPCs for building surfaces/wipe samples. There are no standard equations for assessing exposure to PCBs and lead on indoor surfaces (i.e., wipe samples). Based on the magnitude of the exceedances relative to the screening values (see Table 2.20), Aroclor 1248, Aroclor 1260, and lead are retained as risk drivers for the current trespasser/visitor receptor (both child and adult).

6.5 ASBESTOS-CONTAINING MATERIAL

As described in Section 2, 1 of the 6 friable building material samples and 15 of 57 soil samples analyzed contained greater than 1% ACM (sample BWABS01), confirming the potential for ACM at the Site to pose a risk to human health. ACM is identified as a risk driver for the current trespasser/visitor (both child and adult). The three structures currently standing at the Site are to be demolished before the site is re-used and ACM will be properly disposed of during building demolition activities. Accordingly, ACM is not identified as a risk driver for future site receptors.

6.6 OFF-SITE VAPOR INTRUSION

Several buildings are present on adjacent properties within 100 ft of the Site and the vapor intrusion exposure pathway may be complete for these buildings. Potential risks to off-site receptors exposed to Site contaminants via vapor intrusion were evaluated qualitatively.

Vinyl chloride, cyanide, and mercury were identified as vapor intrusion COPCs for on-site receptors. Of these COPCs, only mercury was identified as a risk driver for the vapor intrusion pathway. This metal contributes an HQ of 0.2 to a cumulative target organ HI exceeding 1 (neurological and development target organ HIs) for the child resident. The vapor intrusion screening value calculated for mercury using EPA's VISL is 0.089 µg/L (Table 2.18 in Attachment A). Of the 100 samples comprising the Site groundwater dataset, 20 samples contained positive detections of mercury. The maximum detection is 1.1 µg/L in monitoring well WATW04. The data do not indicate the presence of a mercury plume in groundwater. Based on the HQ calculated for the child resident, it is unlikely that volatilization of mercury from the Site groundwater would pose a risk to off-site receptors.

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7.0 UNCERTAINTY ASSESSMENT

Conducting a risk assessment requires making a number of assumptions that introduce uncertainty in the risk and hazard estimates. The potential uncertainties resulting from chemical analysis, exposure assessment, and toxicity assessment are discussed below.

7.1 CHEMICAL ANALYSIS

At any site, it is possible that there are more individual chemical substances present than identified in the sampling and analysis effort. Because the historical use of the site is known, the analytical suites used in the investigations included all potential site contaminants. To account for all potential contaminants, the analytical suite spanned a wide range of chemicals: metals, VOCs, SVOCs, pesticides, explosives, PCDDs/PCDFs, PCBs (both as Aroclors and individual congeners), and radionuclides. With the exception that fish and oyster tissue samples were not analyzed for Cr(VI) and radionuclides, it is unlikely that the analytical suites used in the investigation omitted potential contaminants.

All analytical data used in the HHRA were validated to confirm that quality control was maintained by the analytical laboratory. Data validation decreases the uncertainty associated with the analytical results, as only results that are determined to be usable were used in the HHRA.

Even with data validation, it is possible that an analytical method was not sensitive enough to detect potential contaminants at concentrations that could pose a risk to human health. Such a case can arise where the reporting limits (RLs) for those analytes not detected in any sample of a given medium are greater than their risk-based screening values. It is possible that nondetected results could mask Site-wide low levels of contamination. To assess the uncertainty associated with analytical sensitivity, one-half the reporting limits for analytes not detected in any samples from a given exposure area were compared to the health-based screening values. These comparisons are provided in Attachment E. One-half the reporting limits for several analytes exceed the screening values, indicating the potential for risk to have been underestimated.

7.2 CHROMIUM SPECIATION

Speciation analysis for chromium was performed on a subset of surface soil, total soil, Estuarine Wetland sediment, Paradise Creek sediment, and groundwater samples. Chromium speciation analysis was not performed on the non-tidal Freshwater Wetland sediment, NDC sediment, Estuarine Wetland surface water, NDC surface water, Paradise Creek surface water, fish tissue, and shellfish tissue.

The speciated results suggest that chromium is present in both the hexavalent and trivalent forms, at varying proportions. Because not all samples were speciated and because some datasets were not speciated at all, total chromium data was evaluated in the HHRA using both trivalent and hexavalent toxicity values. In other words, the HHRA evaluated total chromium using Cr(VI) toxicity values in all cases where speciation data was not available. Given that Cr(VI) comprises only a portion of the total chromium results, calculations that assume all chromium is in the hexavalent form likely overestimate the cancer risks and non-cancer HQs.

Potential risks to residents of the Cradock community were evaluated using 14 of the Paradise Creek sediment samples. Three of these samples were analyzed for both total chromium and Cr(VI). Eleven samples were analyzed for total chromium but were not speciated. Cr(VI) was not detected in the three speciated samples. Based on these nondetect results, all results for total chromium were assumed to represent trivalent chromium. The total chromium results of the speciated samples, however, were less than detections for several of the unspeciated samples. Given the presence of Cr(VI) contamination at the site, it is possible that chromium is present in this valence state in the sediment samples with the highest total chromium concentrations. In this situation, potential risks to the Cradock community residents would be underestimated. This uncertainty is mitigated by the tendency of Cr(VI) to reduce to the trivalent state under anaerobic conditions. Sediment is often anaerobic.

7.3 INHALATION OF SEDIMENT

For this HHRA, it was assumed that the sediment could dry out during construction projects and generate fugitive dust emissions in the same manner as excavated soil. For this reason, the HHRA evaluated exposure of the utility worker and construction worker (dock project) to fugitive dust from sediment. It is unlikely that a dewatering system would be installed for a utility trench excavation. Although dewatering could occur during dock construction, it is unlikely that the sediment would dry out sufficiently to generate dust. Inclusion of this exposure route for the utility worker and construction worker (dock project) likely overestimates potential risks to these receptors.

7.4 EXPOSURE ASSESSMENT

To estimate chemical intake, it is necessary to make assumptions regarding ingestion rates, exposure frequencies, and the other variables that comprise the equations. Where possible, standard default exposure values developed by EPA were used. These values are intended to provide an estimate of the RME for each receptor.

7.5 TOXICITY ASSESSMENT

All toxicity values were obtained from peer-reviewed sources in accordance with EPA guidance. For some chemical substances, there is little or no toxicity information available and, for many chemicals, the available data are typically from animal studies. The relative strength of the available toxicological information generates some uncertainty in evaluating possible adverse health effects and the exposure level at which they may occur. To account for this uncertainty, the toxicity values developed from epidemiological studies are calculated in a conservative manner. Although new epidemiological studies may indicate that existing toxicity values are not sufficiently protective, it is expected that the general approach to toxicity assessment would tend to err on the side of overestimating potential risks.

Numerical toxicity values for dermal exposure have not been developed by EPA. To quantify risk from dermal exposure, a route-to-route extrapolation of the oral toxicity value to a dermal toxicity value was used. Because of potential differences in patterns of distribution, metabolism, and excretion between oral and dermal routes of exposure, use of oral toxicity values for dermal exposure may overestimate or underestimate risk, depending on the chemical.

7.6 CONSUMPTION OF FISH AND SHELLFISH

No sport fish tissue samples were collected. In addition, the mummichog and oyster samples were not analyzed for radionuclides and Cr(VI). The HHRA used a combination of mummichog data, sediment data, surface water data, and biotransfer factors to estimate the contaminant tissue concentrations of fish and shellfish that people might eat. By selecting the approach that yielded the maximum tissue concentration, the HHRA attempted to err on the side of conservatism. Depending on site-specific conditions, however, the lack of sport fish samples and lack of tissue data for Cr(VI) and radionuclides could overestimate or underestimate risk.

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8.0 HUMAN HEALTH RISK ASSESSMENT SUMMARY

The HHRA was conducted to evaluate the human health risks associated with potential current and future exposure of people to contaminated soil, groundwater, surface water, sediment, fish tissue, and shellfish tissue at the Peck Iron and Metal Superfund Site. Table 6.1 summarizes the results of the HHRA.

Table 6.1 and Attachment A Tables 9.30 through 9.58, summarize the cancer risk and non-cancer hazards associated with exposure to site-related COPCs for all scenarios evaluated in the HHRA. Attachment A Tables 10.1 through 10.26 present the risk drivers for each receptor. The risk drivers are those COPCs that contributed HQs greater than 0.1 to total target organ HIs greater than 1 or carcinogenic risks greater than 10^{-6} to total carcinogenic risks greater than 10^{-4}.

The child resident is the most conservative receptor with respect to non-cancer effects. As shown below, PCB and PCDD/PCDF contributed to more than half of the total non-cancer HI estimated for the future child resident. Site-related metals contributed almost one-third to the total HI for the child resident.

Chemical Group	Percent of Cumulative Non-Cancer HI (Site-Related)	Media with Risk Drivers
PCBs, PCDD/PCDF, dioxin-like PCB toxic equivalencies (TEQ)	61%	Soil Groundwater NDC Sediment NDC Surface Water Estuarine Wetland Surface Water Fish Tissue Shellfish Tissue
Metals	31%	Soil Groundwater NDC Sediment Paradise Creek Sediment Estuarine Wetland Sediment Estuarine Wetland Surface Water Fish Tissue Shellfish Tissue

The age-adjusted resident is the most conservative receptor for estimating cancer risks. As shown below, site-related radionuclides account for 94% of the cumulative cancer risk estimated for the age-adjusted resident.

Chemical Group	Percent of Cumulative Cancer Risk (Site-Related)	Media with Risk Drivers
Radionuclides	94%	Soil Groundwater Freshwater Wetland Sediment Estuarine Wetland Sediment NDC Surface Water Estuarine Wetland Surface Water Fish Tissue Shellfish Tissue
PCBs, PCDD/PCDF, High-risk PCBs, dioxin-like PCB TEQ	2.6%	Soil Groundwater NDC Sediment Paradise Creek Sediment Estuarine Wetland Sediment NDC Surface Water Estuarine Wetland Surface Water Fish Tissue Shellfish Tissue
Metals	0.42%	Soil Groundwater NDC Sediment Freshwater Wetland Sediment Paradise Creek Sediment Estuarine Wetland Sediment NDC Surface Water Paradise Creek Surface Water Estuarine Wetland Surface Water Fish Tissue Shellfish Tissue
Vinyl Chloride	0.09%	Groundwater
Pesticides	0.007%	Fish Tissue Shellfish Tissue
Polynuclear Aromatic Hydrocarbons	0.005%	Soil NDC Sediment Estuarine Wetland Sediment

ACM and wipe sample analytical data were evaluated qualitatively. Aroclor 1248, Aroclor 1260, and lead on current building surfaces, investigated through wipe sampling, and ACM within the current Brick Warehouse building are identified as risk drivers for the current trespasser/visitor. Because all Site buildings are to be demolished before the Site is re-used, no risks are identified for future site receptors.

The HHRA evaluated potential risks to on-site receptors exposed to contaminants via the vapor intrusion pathway and identified mercury as a risk driver for this exposure route based on an HQ of 0.2. Based on the HQ calculated for the child resident, it is unlikely that volatilization of mercury from Site groundwater would pose a risk to off-site receptors.

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TABLE

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Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Current			Current			Risk Drivers
Receptor			Trespasser/Visitor			Trespasser/Visitor			
Receptor Age			Child	Adolescent	Adult	Child	Adolescent	Adult	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	1.E-03	1.E-03	2.E-03	1.E-03	1.E-03	2.E-03	See below for specific media
		HI	22	6	3	21	6	3	
Peck Iron and Metal Site	Surface Soil	ELCR	9.E-04	1.E-03	2.E-03	9.E-04	1.E-03	2.E-03	Benzo(a)pyrene; Aroclor 1248; Aroclor 1260; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; arsenic; Cr(VI); Bi-214; Pb-210; Pb-214; Ra-226
		HI	9	2	1	9	2	1	Cobalt; thallium; vanadium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Total Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Groundwater	ELCR	6.E-08	9.E-08	2.E-07	6.E-08	9.E-08	2.E-07	--
		HI	0.009	0.009	0.009	0.009	0.009	0.009	--
	NDC Surface Water	ELCR	1.E-05	2.E-05	2.E-05	1.E-05	2.E-05	2.E-05	Cr(VI); 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	1	0.4	1	1	0.4	2,3,7,8-TCDD TEQ
	NDC Sediment	ELCR	2.E-05	1.E-05	6.E-06	2.E-05	1.E-05	5.E-06	Cr(VI); 2,3,7,8-TCDD TEQ
		HI	0.7	0.2	0.09	0.7	0.2	0.09	Thallium
	Freshwater Wetland Sediment	ELCR	1.E-05	8.E-06	1.E-05	8.E-06	5.E-06	5.E-06	Cr(VI); Ra-226
		HI	0.03	0.01	0.006	0.009	0.007	0.003	--
Paradise Creek	Paradise Creek Surface Water	ELCR	2.E-06	2.E-06	1.E-06	1.E-06	9.E-07	5.E-07	--
		HI	0.2	0.09	0.05	0.1	0.03	0.03	--
	Estuarine Wetland Surface Water	ELCR	6.E-05	5.E-05	3.E-05	6.E-05	5.E-05	3.E-05	Cr(VI); dioxin-like PCB TEQ; Ra-226
		HI	1	1	0.4	1	1	0.4	Dioxin-like PCB TEQ; cobalt
	Paradise Creek Sediment	ELCR	1.E-04	6.E-05	3.E-05	1.E-04	5.E-05	2.E-05	Cr(VI)
		HI	0.7	0.2	0.1	0.6	0.2	0.1	Cobalt
	Estuarine Wetland Sediment	ELCR	2.E-05	1.E-05	1.E-05	2.E-05	1.E-05	5.E-06	Cr(VI)
		HI	9	2	1	9	2	1	Cobalt, thallium
	Fish/Shellfish Tissue	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the current child trespasser/visitor: Surface soil, estuarine wetland sediment

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Current			Current			Risk Drivers
Receptor			Recreational User/Fisherman			Recreational User/Fisherman			
Receptor Age			Child	Adolescent	Adult	Child	Adolescent	Adult	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	3.E-03	3.E-03	6.E-03	2.E-03	2.E-03	5.E-03	See below for specific media
		HI	159	85	83	142	74	72	
Peck Iron and Metal Site	Surface Soil	ELCR	9.E-04	1.E-03	2.E-03	9.E-04	1.E-03	2.E-03	Benzo(a)pyrene; Aroclor-1248; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	9	2	1	9	2	1	Aroclor-1254; cobalt; copper; iron; thallium; vanadium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Total Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Groundwater	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Surface Water	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	3.E-06	2.E-06	2.E-06	2.E-06	1.E-06	7.E-07	Cr(VI)
		HI	0.3	0.1	0.07	0.2	0.07	0.04	Thallium
	Estuarine Wetland Surface Water	ELCR	9.E-05	8.E-05	5.E-05	9.E-05	8.E-05	5.E-05	Cr(VI); high-risk PCBs; dioxin-like PCB TEQ; Ra-226
		HI	2	2	0.7	2	2	0.7	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	1.E-04	6.E-05	6.E-05	1.E-04	6.E-05	4.E-05	Cr(VI)
		HI	1	0.5	0.2	1	0.5	0.2	Cobalt; dioxin-like PCB TEQ
	Estuarine Wetland Sediment	ELCR	3.E-05	2.E-05	3.E-05	2.E-05	1.E-05	1.E-05	Aroclor-1248; arsenic; Cr(VI)
		HI	18	4	2	18	4	2	Cobalt; thallium
	Fish/Shellfish Tissue	ELCR	1.E-03	1.E-03	4.E-03	1.E-03	1.E-03	3.E-03	Chlordane; Aroclor-1254; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Cr(VI); aldrin; heptachlor epoxide; Bi-214; Pb-214
		HI	128	77	79	112	67	68	Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; iron; cobalt; mercury
	RISKS ASSOCIATED WITH EXPOSURE TO ONLY FISH AND SHELLFISH								
	Fish/Shellfish Tissue	ELCR	1.E-03	1.E-03	4.E-03	1.E-03	1.E-03	3.E-03	Chlordane; Aroclor-1254; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Cr(VI); aldrin; heptachlor epoxide; Bi-214; Pb-214
		HI	128	77	79	112	67	68	Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; mercury
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the current recreational user/fisherman: Surface soil, estuarine wetland sediment, shellfish tissue, and fish tissue

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.
Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210
Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Current			Current			Risk Drivers
Receptor			Cradock Community Resident			Cradock Community Resident			
Receptor Age			Child	Adult	Age-Adjusted	Child	Adult	Age-Adjusted	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	--	--	5.E-04	--	--	1.E-04	See below for specific media
		HI	8	1	--	6	0.8	--	
Paradise Creek	Cradock Community Sediment	ELCR	--	--	5.E-04	--	--	1.E-04	--
		HI	8	1	--	6	0.8	--	Cobalt
Lead (All Exposure Areas/Media)									Lead is not identified as a risk driver for any applicable media for this receptor.

-- = Cancer risks are evaluated for age-adjusted resident, and non-cancer hazards are evaluated separately for child resident and adult resident
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future	Future	Risk Drivers
Receptor			Outdoor Maintenance Worker	Outdoor Maintenance Worker	
Receptor Age			Adult	Adult	
			Total Risk (All COPCs)	Site-Related Risk (Excluding Background COPCs)	
Total (All Media)		ELCR	2.E-02	2.E-02	See below for specific media
		HI	7	7	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--
		HI	--	--	
	Total Soil	ELCR	2.E-02	2.E-02	Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	7	7	Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	--	--	--
		HI	--	--	
	NDC Surface Water	ELCR	--	--	--
		HI	--	--	
	NDC Sediment	ELCR	--	--	--
		HI	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--
		HI	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Surface Water	ELCR	--	--	--
		HI	--	--	
	Paradise Creek Sediment	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Sediment	ELCR	--	--	--
		HI	--	--	
	Fish/Shellfish Tissue	ELCR	--	--	--
		HI	--	--	
Lead (All Exposure Areas/Media)					Lead is identified as a risk driver in the following media for the future outdoor maintenance worker: Total soil

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future			Future			Risk Drivers
Receptor			Recreational User/Fisherman			Recreational User/Fisherman			
Receptor Age			Child	Adolescent	Adult	Child	Adolescent	Adult	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	3.E-03	3.E-03	6.E-03	2.E-03	2.E-03	5.E-03	--
		HI	167	89	84	151	78	73	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Total Soil	ELCR	1.E-03	1.E-03	2.E-03	1.E-03	1.E-03	2.E-03	Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	17	6	2	17	6	2	Aroclor-1254; cobalt; thallium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Surface Water	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	3.E-06	2.E-06	2.E-06	2.E-06	1.E-06	7.E-07	Cr(VI)
		HI	0.3	0.1	0.07	0.2	0.07	0.04	Thallium
	Estuarine Wetland Surface Water	ELCR	9.E-05	8.E-05	5.E-05	9.E-05	8.E-05	5.E-05	Cr(VI); high-risk PCBs; dioxin-like PCB TEQ; Ra-226
		HI	2	2	0.7	2	2	0.7	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	1.E-04	6.E-05	6.E-05	1.E-04	6.E-05	4.E-05	Cr(VI); dioxin-like PCB TEQ; Bi-214; Pb-214
		HI	1	0.5	0.2	1	0.5	0.2	Cobalt; dioxin-like PCB TEQ
	Estuarine Wetland Sediment	ELCR	3.E-05	2.E-05	3.E-05	2.E-05	1.E-05	1.E-05	Aroclor-1248; arsenic; Cr(VI); Pb-214
		HI	18	4	2	18	4	2	Cobalt; thallium
	Fish/Shellfish Tissue	ELCR	1.E-03	1.E-03	4.E-03	1.E-03	1.E-03	3.E-03	Aldrin; chlordane; heptachlor epoxide; 4,4'-DDE; Aroclor-1254; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Cr(VI); Bi-214; Pb-214; Sr-90
		HI	128	77	79	112	67	68	Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; cobalt; mercury
	RISKS ASSOCIATED WITH EXPOSURE TO ONLY FISH AND SHELLFISH								
	Fish/Shellfish Tissue	ELCR	1.E-03	1.E-03	4.E-03	1.E-03	1.E-03	3.E-03	Chlordane; Aroclor-1254; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Cr(VI); aldrin; heptachlor epoxide; Bi-214; Pb-214
		HI	128	77	79	112	67	68	Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; mercury
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the future recreational user/fisherman: Surface soil, estuarine wetland sediment, shellfish tissue, and fish tissue

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future			Future			Risk Drivers
Receptor			Trespasser/Visitor			Trespasser/Visitor			
Receptor Age			Child	Adolescent	Adult	Child	Adolescent	Adult	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	1.E-03	1.E-03	2.E-03	1.E-03	1.E-03	2.E-03	See below for specific media
		HI	30	10	3	30	10	4	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Total Soil	ELCR	1.E-03	1.E-03	2.E-03	1.E-03	1.E-03	2.E-03	Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	17	6	2	17	6	2	Aroclor-1254; cobalt; thallium; dioxin-like PCB TEQ 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	6.E-08	9.E-08	2.E-07	6.E-08	9.E-08	2.E-07	--
		HI	0.009	0.009	0.009	0.009	0.009	0.009	--
	NDC Surface Water	ELCR	1.E-05	2.E-05	2.E-05	1.E-05	2.E-05	2.E-05	Cr(VI); 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	1	0.4	1	1	0.4	2,3,7,8-TCDD TEQ
	NDC Sediment	ELCR	2.E-05	1.E-05	6.E-06	2.E-05	1.E-05	6.E-06	Cr(VI); 2,3,7,8-TCDD TEQ
		HI	0.7	0.2	0.09	0.7	0.2	0.09	Thallium; 2,3,7,8-TCDD TEQ
	Freshwater Wetland Sediment	ELCR	1.E-05	8.E-06	1.E-05	8.E-06	5.E-06	5.E-06	Cr(VI); Ra-226
		HI	0.03	0.01	0.006	0.009	0.007	0.003	--
Paradise Creek	Paradise Creek Surface Water	ELCR	2.E-06	2.E-06	1.E-06	1.E-06	9.E-07	5.E-07	--
		HI	0.2	0.1	0.05	0.1	0.04	0.03	--
	Estuarine Wetland Surface Water	ELCR	6.E-05	5.E-05	3.E-05	6.E-05	5.E-05	3.E-05	Cr(VI); dioxin-like PCB TEQ; Ra-226
		HI	1	1	0.4	1	1	0.4	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	1.E-04	6.E-06	3.E-05	1.E-04	5.E-05	2.E-05	Cr(VI)
		HI	0.7	0.2	0.1	0.6	0.2	0.1	Cobalt
	Estuarine Wetland Sediment	ELCR	2.E-05	1.E-05	1.E-05	2.E-05	1.E-05	7.E-06	Cr(VI)
		HI	9	2	1	9	2	1	Cobalt, thallium
	Fish/Shellfish Tissue	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the future trespasser/visitor: Surface soil and estuarine wetland sediment

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future			Future			Risk Drivers
Receptor			Subsistence Fisherman			Subsistence Fisherman			
Receptor Age			Child	Adult	Age-Adjusted	Child	Adult	Age-Adjusted	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	--	--	2.E-02	--	--	2.E-02	See below for specific media
		HI	342	424	--	296	357	--	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Total Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Groundwater	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Surface Water	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	NDC Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	5.E-06	--	--	3.E-06	Cr(VI)
		HI	0.3	0.07	--	0.2	0.04	--	--
	Estuarine Wetland Surface Water	ELCR	--	--	1.E-04	--	--	1.E-04	Cr(VI); dioxin-like PCB TEQ; high-risk PCBs; 2,3,7,8-TCDD TEQ; Ra-226
		HI	2	0.7	--	2	0.7	--	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	--	--	3.E-04	--	--	3.E-04	Arsenic; Cr(VI); dioxin-like PCB TEQ; Bi-214; Pb-214
		HI	1	0.2	--	1	0.2	--	Cobalt; dioxin-like PCB TEQ
	Estuarine Wetland Sediment	ELCR	--	--	7.E-05	--	--	6.E-05	Benzo(a)pyrene; dibenzo(a,h)anthracene; Aroclor-1248; arsenic; Cr(VI); Bi-214; Pb-214
		HI	18	2	--	18	2	--	Cobalt
	Fish/Shellfish Tissue	ELCR	--	--	2.E-02	--	--	2.E-02	Chlordane; high-risk PCBs; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-214; Sr-90; aldrin; 4,4'-DDD; 4,4'-DDE; heptachlor epoxide; Aroclor-1254
		HI	320	421	--	275	354	--	Aldrin; chlordane; heptachlor epoxide; Aroclor-1254; cobalt; iron; manganese; mercury; 4,4'-DDD; 4,4'-DDE; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the future subsistence fisherman: Estuarine wetland sediment, shellfish tissue, and fish tissue

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future	Future	Risk Drivers
Receptor			Indoor Worker	Indoor Worker	
Receptor Age			Adult	Adult	
			Total Risk (All COPCs)	Site-Related Risk (Excluding Background COPCs)	
Total (All Media)		ELCR	2.E-06	2.E-06	See below for specific media
		HI	0.08	0.08	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--
		HI	--	--	
	Total Soil	ELCR	--	--	--
		HI	--	--	
	Groundwater	ELCR	2.E-06	2.E-06	--
		HI	0.08	0.08	
	NDC Surface Water	ELCR	--	--	--
		HI	--	--	
	NDC Sediment	ELCR	--	--	--
		HI	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--
		HI	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Surface Water	ELCR	--	--	--
		HI	--	--	
	Paradise Creek Sediment	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Sediment	ELCR	--	--	--
		HI	--	--	
	Fish/Shellfish Tissue	ELCR	--	--	--
		HI	--	--	
Lead (All Exposure Areas/Media)					Lead is not identified as a risk driver for any applicable media for this receptor.

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.
Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210
Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future	Future	Risk Drivers
Receptor			Utility Worker	Utility Worker	
Receptor Age			Adult	Adult	
			Total Risk (All COPCs)	Site-Related Risk (Excluding Background COPCs)	
Total (All Media)		ELCR	8.E-05	7.E-05	See below for specific media
		HI	67	67	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--
		HI	--	--	
	Total Soil	ELCR	7.E-05	7.E-05	--
		HI	25	25	Aroclor-1254; cobalt; mercury; thallium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	2.E-07	2.E-07	--
		HI	23	23	Cyanide; 2,3,7,8-TCDD TEQ
	NDC Surface Water	ELCR	2.E-07	2.E-07	--
		HI	2	2	2,3,7,8-TCDD TEQ
	NDC Sediment	ELCR	2.E-07	1.E-07	--
		HI	1	1	Thallium; 2,3,7,8-TCDD TEQ
	Freshwater Wetland Sediment	ELCR	3.E-07	2.E-07	--
		HI	0.05	0.04	
Paradise Creek	Paradise Creek Surface Water	ELCR	1.E-08	1.E-08	--
		HI	0.1	0.1	
	Estuarine Wetland Surface Water	ELCR	4.E-07	4.E-07	--
		HI	1	1	Dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	6.E-07	4.E-07	--
		HI	1	1	Cobalt
	Estuarine Wetland Sediment	ELCR	4.E-07	2.E-07	--
		HI	14	14	Cobalt; mercury; thallium
	Fish/Shellfish Tissue	ELCR	--	--	--
		HI	--	--	
Lead (All Exposure Areas/Media)					Lead is not identified as a risk driver for any applicable media for this receptor.

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future	Future	Risk Drivers
Receptor			Construction Worker Default Construction Project	Construction Worker Default Construction Project	
Receptor Age			Adult	Adult	
			Total Risk (All COPCs)	Site-Related Risk (Excluding Background COPCs)	
Total (All Media)		ELCR	1.E-03	1.E-03	See below for specific media
		HI	54	54	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--
		HI	--	--	
	Total Soil	ELCR	1.E-03	1.E-03	Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	33	33	Aroclor-1254; aluminum; cobalt; manganese; mercury; nickel; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	0.E+00	0.E+00	--
		HI	22	22	Cyanide
	NDC Surface Water	ELCR	--	--	--
		HI	--	--	
	NDC Sediment	ELCR	--	--	--
		HI	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--
		HI	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Surface Water	ELCR	--	--	--
		HI	--	--	
	Paradise Creek Sediment	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Sediment	ELCR	--	--	--
		HI	--	--	
	Fish/Shellfish Tissue	ELCR	--	+	--
		HI	--	--	
Lead (All Exposure Areas/Media)					Lead is identified as a risk driver in the following media for the future construction worker (default project): Total soil

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.
Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210
Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future	Future	Risk Drivers
Receptor			Construction Worker Dock Construction Project	Construction Worker Dock Construction Project	
Receptor Age			Adult	Adult	
			Total Risk (All COPCs)	Site-Related Risk (Excluding Background COPCs)	
Total (All Media)		ELCR	9.E-06	5.E-06	See below for specific media
		HI	30	30	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--
		HI	--	--	
	Total Soil	ELCR	--	--	--
		HI	--	--	
	Groundwater	ELCR	--	--	--
		HI	--	--	--
	NDC Surface Water	ELCR	--	--	--
		HI	--	--	
	NDC Sediment	ELCR	--	--	--
		HI	--	--	
	Freshwater Wetland Sediment	ELCR	--	--	--
		HI	--	--	
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	--
		HI	--	--	
	Estuarine Wetland Surface Water	ELCR	--	--	--
		HI	--	--	
	Paradise Creek Sediment	ELCR	5.E-06	3.E-06	--
		HI	2	2	Cobalt; mercury
	Estuarine Wetland Sediment	ELCR	4.E-06	2.E-06	--
		HI	28	28	Cobalt; mercury
	Fish/Shellfish Tissue	ELCR	--	--	--
		HI	--	--	
Lead (All Exposure Areas/Media)					Lead is not identified as a risk driver for any applicable media for this receptor.

-- = Receptor has an incomplete exposure pathway to the applicable media
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210

Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future			Future			Risk Drivers
Receptor			Resident			Resident			
Receptor Age			Child	Adult	Age-Adjusted	Child	Adult	Age-Adjusted	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR			3.E-01			3.E-01	See below for specific media
		HI	319	141		302	130		
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Total Soil	ELCR	--	--	3.E-02	--	--	3.E-02	Benzo(a)pyrene; dibenzo(a,h)anthracene; Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	101	12	--	101	12	--	Aroclor-1254; aluminum; antimony; arsenic; cobalt; copper; iron; manganese; mercury; thallium; vanadium; zinc; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Groundwater	ELCR	--	--	2.E-01	--	--	2.E-01	Arsenic; Cr(VI); vinyl chloride; dioxin-like PCB TEQ; high risk PCBs; 2,3,7,8-TCDD TEQ; Bi-214, Pb-210, Pb-214, Ra-226, Sr-90
		HI	77	47	--	77	47	--	Antimony; arsenic; cobalt; iron; manganese; mercury; thallium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	NDC Surface Water	ELCR	--	--	3.E-05	--	--	3.E-05	Cr(VI); 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	0.4	--	1	0.4	--	2,3,7,8-TCDD TEQ
	NDC Sediment	ELCR	--	--	3.E-05	--	--	3.E-05	Benzo(a)pyrene; arsenic; Cr(VI); 2,3,7,8-TCDD TEQ
		HI	0.7	0.09	--	0.7	0.09	--	Thallium; 2,3,7,8-TCDD TEQ
	Freshwater Wetland Sediment	ELCR	--	--	2.E-05	--	--	1.E-05	Cr(VI); Pb-214; Ra-226
		HI	0.03	0.006	--	0.01	0.003	--	--
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	4.E-06	--	--	2.E-06	Cr(VI)
		HI	0.2	0.05	--	0.1	0.03	--	--
	Estuarine Wetland Surface Water	ELCR	--	--	1.E-04	--	--	1.E-04	Cr(VI); dioxin-like PCB TEQ; high-risk PCBs; 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	0.4	--	1	0.4	--	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	--	--	3.E-04	--	--	3.E-04	Arsenic; Cr(VI); dioxin-like PCB TEQ
		HI	0.7	0.1	--	0.6	0.1	--	Cobalt
	Estuarine Wetland Sediment	ELCR	--	--	7.E-05	--	--	6.E-05	Dibenzo(a,h)anthracene; Aroclor-1248; arsenic; Cr(VI)
		HI	9	1	--	9	1	--	Cobalt; thallium
	Fish/Shellfish Tissue	ELCR	--	--	5.E-03	--	--	4.E-03	Aldrin; chlordane; 4,4'-DDE; heptachlor epoxide; Aroclor-1254; Cr(VI); high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-214; Sr-90
		HI	128	79	--	112	68	--	Aroclor-1254; cobalt; iron; manganese; mercury; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the future resident: Total soil, groundwater, estuarine wetland sediment, shellfish tissue, and fish tissue

-- = Cancer risks are evaluated for age-adjusted resident, and non-cancer hazards are evaluated separately for child resident and adult resident; future resident is exposed to total soil, not surface soil
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210
Pb-214 = lead-214
Sr-90 = strontium-90

Table 6.1
Human Health Risk Assessment Summary
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Timeframe			Future			Future			Risk Drivers
Receptor			Resident (Surface Soil Only)			Resident (Surface Soil Only)			
Receptor Age			Child	Adult	Age-Adjusted	Child	Adult	Age-Adjusted	
			Total Risk (All COPCs)			Site-Related Risk (Excluding Background COPCs)			
Total (All Media)		ELCR	--	--	3.E-01	--	--	3.E-01	See below for specific media
		HI	271	136	--	254	125	--	
Peck Iron and Metal Site	Surface Soil	ELCR	--	--	3.E-02	--	--	3.E-02	Benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenzo(a,h)anthracene; Aroclor-1248; Aroclor-1254; Aroclor-1260; high-risk PCBs; arsenic; Cr(VI); dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-210; Pb-214; Ra-226
		HI	53	8	--	53	8	--	Aroclor-1254; aluminum; antimony; arsenic; cobalt; copper; iron; manganese; thallium; vanadium; zinc; mercury; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
	Total Soil	ELCR	--	--	--	--	--	--	--
		HI	--	--	--	--	--	--	
	Groundwater	ELCR	--	--	2.E-01	--	--	2.E-01	Arsenic; Cr(VI); vinyl chloride; dioxin-like PCB TEQ; high-risk PCBs; 2,3,7,8-TCDD TEQ; Bi-214, Pb-210, PB-214, Ra-226, Sr-90
		HI	77	47	--	77	47	--	Antimony; arsenic; cobalt; iron; manganese; mercury; thallium; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; cyanide
	NDC Surface Water	ELCR	--	--	3.E-05	--	--	3.E-05	Cr(VI); 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	0.4	--	1	0.4	--	2,3,7,8-TCDD TEQ
	NDC Sediment	ELCR	--	--	3.E-05	--	--	3.E-05	Benzo(a)pyrene; arsenic; Cr(VI); 2,3,7,8-TCDD TEQ
		HI	0.7	0.09	--	0.7	0.09	--	Thallium; 2,3,7,8-TCDD TEQ
	Freshwater Wetland Sediment	ELCR	--	--	2.E-05	--	--	1.E-05	Cr(VI); Pb-214, Ra-226
		HI	0.03	0.006	--	0.01	0.003	--	--
Paradise Creek	Paradise Creek Surface Water	ELCR	--	--	4.E-06	--	--	2.E-06	Cr(VI)
		HI	0.2	0.05	--	0.1	0.03	--	--
	Estuarine Wetland Surface Water	ELCR	--	--	1.E-04	--	--	1.E-04	Cr(VI); dioxin-like PCB TEQ; high-risk PCBs; 2,3,7,8-TCDD TEQ; Ra-226
		HI	1	0.4	--	1	0.4	--	Cobalt; dioxin-like PCB TEQ
	Paradise Creek Sediment	ELCR	--	--	3.E-04	--	--	3.E-04	Arsenic; Cr(VI); dioxin-like PCB TEQ
		HI	0.7	0.1	--	0.6	0.1	--	Cobalt
	Estuarine Wetland Sediment	ELCR	--	--	7.E-05	--	--	6.E-05	Dibenzo(a,h)anthracene; Aroclor-1248; arsenic; Cr(VI)
		HI	9	1	--	9	1	--	Cobalt, thallium
	Fish/Shellfish Tissue	ELCR	--	--	5.E-03	--	--	4.E-03	Aldrin; chlordane; 4,4'-DDE; heptachlor epoxide; Aroclor-1254; Cr(VI); high-risk PCBs; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ; Bi-214; Pb-214; Sr-90
		HI	128	79	--	112	68	--	Cobalt; iron; manganese; mercury; Aroclor-1254; dioxin-like PCB TEQ; 2,3,7,8-TCDD TEQ
Lead (All Exposure Areas/Media)									Lead is identified as a risk driver in the following media for the future resident: Total soil, groundwater, estuarine wetland sediment, shellfish tissue, and fish tissue

-- = Cancer risks are evaluated for age-adjusted resident, and non-cancer hazards are evaluated separately for child resident and adult resident; resident scenario is for exposure to surface soil, not total soil
ELCR = Excess lifetime cancer risk (CR). The range of regulatory target carcinogenic risk is 1E-06 to 1E-04 (one in one million to one in ten thousand)
HI = Hazard index. A target organ hazard index of less than 1 indicates hazard within regulatory target noncarcinogenic risk level.
Shaded cell indicates a cancer risk or target organ non-cancer hazard exceedance of the cancer risk or non-cancer hazard target.

Cr(VI) = hexavalant chromium
Ra-226 = radium-226
Bi-214 - bismuth-214
Pb-210 = lead-210
Pb-214 = lead-214
Sr-90 = strontium-90

FIGURE

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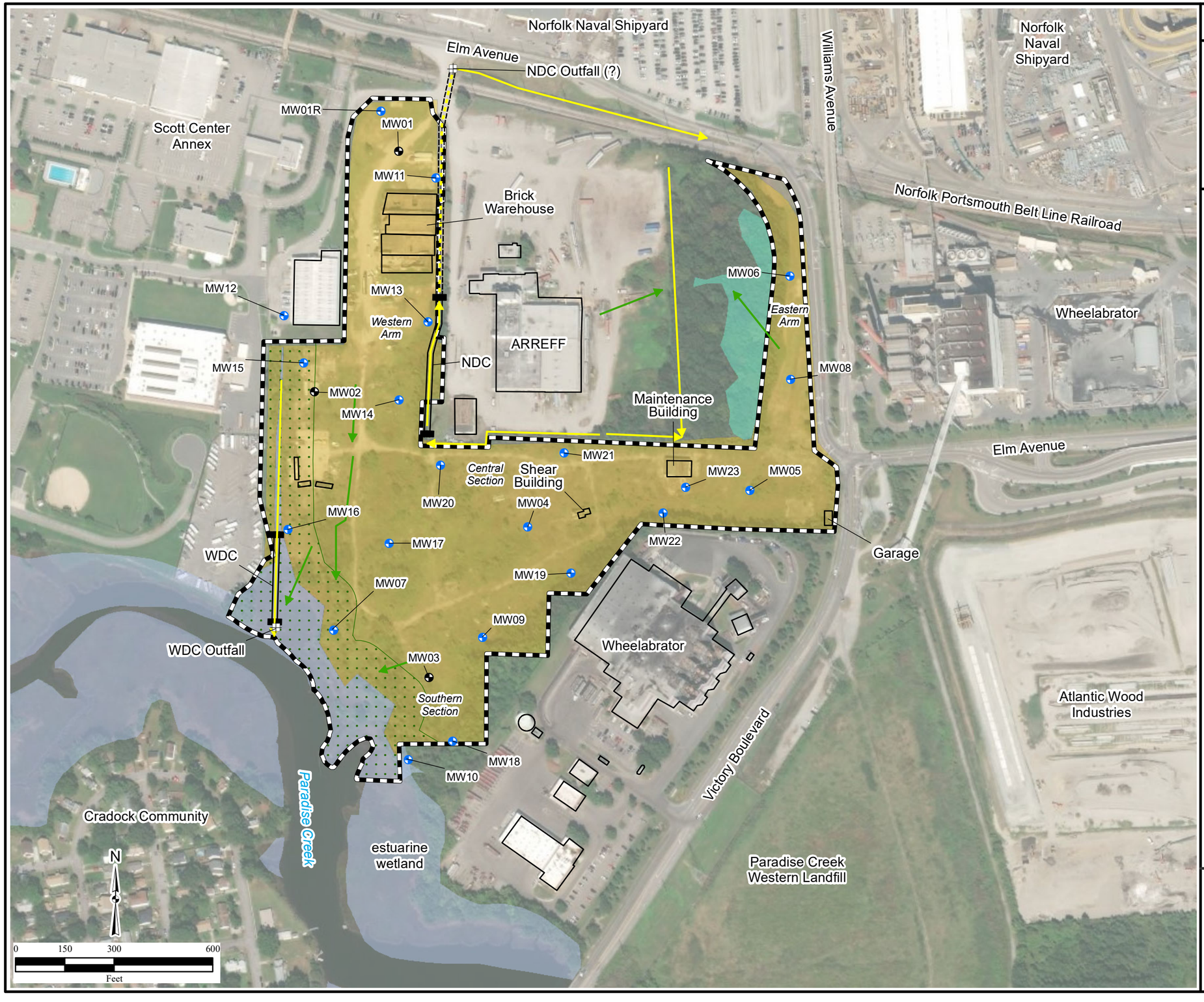
Figure 2.1
Site Layout



Legend

- Site Groundwater Monitoring Well
- Covered Site Groundwater Monitoring Well
- Outfall
- MW01R — Well Identification
- Drainage Pathway (dashed where inferred)
- Overland Surface Water Flow
- Drainage Channel
- Inferred Underground Pipe
- Terrestrial Soil
- Building
- estuarine wetland
- non-tidal freshwater wetland
- Peck property placed into permanent conservation easement with ERP
- Peck Iron and Metal Site

Notes:
Wetland areas are defined and digitized by the National Wetlands Inventory branch of the U.S. Fish and Wildlife Service, September 26, 2011 and revised based on the onsite wetland survey conducted on June 15, 2015 and June 16, 2015.

ERP=Elizabeth River Project
HHRA=Human Health Risk Assessment
NDC=Northwestern Drainage Channel
RI=Remedial Investigation
WDC=Western Drainage Channel

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7/10/2019 TH
Source: HGL, Malcolm Pirnie, EPA, NWI, ArcGIS Online Imagery

HydroGeoLogic, Inc

ATTACHMENT A

RAGS TABLES

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Table 1
Site Receptors and Exposure Routes
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Exposure Area	Receptor	Trespasser/ Visitor				Recreational User/ Fisherman			Fish Consumer	Subsistence Fisherman			Outdoor Maintenance Worker			Resident[2]					Cradock Community Resident			Construction Worker - Default Construction Project				Construction Worker - Dock Construction Project				Utility Worker				Indoor Worker
	Receptor Scenario	Current and Future				Current and Future			Current and Future	Future			Future			Future					Current			Future				Future				Future				Future
	Receptor Age	Child, Adolescent, and Adult				Child, Adolescent, and Adult			Child	Child, Adult, and Age-Adjusted			Adult			Child, Adult, and Age-Adjusted					Child, Adult, and Age-Adjusted			Adult				Adult				Adult				Adult
	Exposure Medium	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Vapor Intrusion	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Ingestion	Ingestion	Dermal Contact	Inhalation	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Inhalation While Showering	Vapor Intrusion	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Vapor Intrusion	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Vapor Intrusion	Ingestion	Dermal Contact	Inhalation of Fugitive Dust or Volatile Emissions	Vapor Intrusion	Vapor Intrusion
Peck Iron and Metal Site	Surface Soil[1]	X	X	X	--	X	X	X	--	--	--	--	X	X	X	X	X	X	--	--	--	--	--	X	X	X	--	--	--	--	--	X	X	X	--	--
	Subsurface Soil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--	X	X	X	--	--	--	--	--	X	X	X	--	--
	NDC Surface Water	X	X	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--
	NDC Sediment	X	X	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--
	Freshwater Sediment	X	X	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	X	--	--
	Groundwater	--	--	--	X	--	--	--	--	--	--	--	--	--	--	X	X	--	X	X	--	--	--	--	X[3]	--	X	--	X[3]	--	X	--	X	--	X	X
Paradise Creek	Paradise Creek Surface Water	X	X	--	--	X	X	--	--	X	X	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--
	Paradise Creek Sediment	X	X	--	--	X	X	--	--	X	X	--	--	--	--	X	X	--	--	--	X	X	X	--	--	--	--	X	X	X	--	X	X	X	--	--
	Estuarine Sediment	X	X	--	--	X	X	--	--	X	X	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	X	X	X	--	X	X	X	--	--
	Estuarine Surface Water	X	X	--	--	X	X	--	--	X	X	--	--	--	--	X	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	X	X	--	--	--
	Fish/Shellfish Tissue	--	--	--	--	X	--	--	X[4]	X	--	--	--	--	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
[1] Future surface soil is represented by the soil data for 0 to 12 ft bgs.
[2] The resident receptor is assumed to be exposed to sediment or surface water under a recreational setting.
[3] Construction worker exposure to groundwater is expected to be negligible and, therefore, will not be quantified.
[4] The fish/shellfish exposure route is quantified as part of the child recreational user/fisherman scenario. Accordingly, the child fish consumer was not included in the quantitative assessment.
X = Exposure pathway is identified as complete for the listed receptor and exposure medium.
-- = Exposure pathway is identified as incomplete for the listed receptor and exposure medium.
NDC = northern drainage channel

Table 2.1
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current
Medium: Peck Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Peck																
	606-20-2	2,6-DINITROTOLUENE	2.70E-01	3.30E-01	mg/kg	MP30	MP30-000005	3 / 73	1.80E-01 - 1.00E+00	3.30E-01	N/A	3.60E-01 c	N/A		NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	1.30E-01 J	8.30E-01 J	mg/kg	OD04	OD04-000005	4 / 73	1.80E-01 - 2.60E-01	8.30E-01	N/A	2.40E+01 n	N/A		NO	BSL
	106-47-8	4-CHLOROANILINE	1.90E-01 J	1.90E-01 J	mg/kg	MP06	MP06-000005	1 / 73	3.50E-01 - 2.00E+00	1.90E-01	N/A	2.70E+00 c	N/A		NO	BSL
	106-44-5	4-METHLYPHENOL	2.40E-01 J	2.40E-01 J	mg/kg	HSTP10	HSTP10-000005	1 / 73	3.50E-01 - 2.00E+00	2.40E-01	N/A	6.30E+02 n	N/A		NO	BSL
	83-32-9	ACENAPHTHENE	5.60E-02 J	3.94E+00 J	mg/kg	OD04	OD04-000005	11 / 73	1.80E-01 - 2.50E-01	3.94E+00	N/A	3.60E+02 n	N/A		NO	BSL
	208-96-8	ACENAPHTHYLENE	1.60E-01 J	5.50E-01	mg/kg	MP48	MP48-000005	2 / 73	1.80E-01 - 1.00E+00	5.50E-01	N/A	3.60E+02 n	N/A		NO	BSL
	98-86-2	ACETOPHENONE	1.20E-01 J	2.40E+00	mg/kg	HSTP10	HSTP10-000005	2 / 73	3.50E-01 - 2.00E+00	2.40E+00	N/A	7.80E+02 n	N/A		NO	BSL
	120-12-7	ANTHRACENE	7.60E-02 J	4.80E+00	mg/kg	OD04	OD04-000005	22 / 73	1.80E-01 - 2.50E-01	4.80E+00	N/A	1.80E+03 n	N/A		NO	BSL
	100-52-7	BENZALDEHYDE	1.90E-01 J	2.90E+00	mg/kg	HSTP10	HSTP10-000005	5 / 73	3.50E-01 - 2.00E+00	2.90E+00	N/A	1.70E+02 c	N/A		NO	BSL
	56-55-3	**BENZO[A]ANTHRACENE**	**1.30E-01 J**	**1.54E+01**	**mg/kg**	**OD04**	**OD04-000005**	**59 / 73**	**1.80E-01 - 2.50E-01**	**1.54E+01**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	50-32-8	**BENZO[A]PYRENE**	**1.20E-01 J**	**1.20E+01**	**mg/kg**	**MP06**	**MP06-000005**	**60 / 73**	**1.80E-01 - 2.50E-01**	**1.20E+01**	**N/A**	**1.10E-01 c**	**N/A**		**YES**	**ASL**
	205-99-2	**BENZO[B]FLUORANTHENE**	**1.10E-01 J**	**1.91E+01**	**mg/kg**	**OD04**	**OD04-000005**	**63 / 73**	**1.80E-01 - 2.50E-01**	**1.91E+01**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	191-24-2	BENZO[G,H,I]PERYLENE	9.40E-02 J	1.10E+01	mg/kg	MP06	MP06-000005	57 / 73	1.80E-01 - 2.50E-01	1.10E+01	N/A	1.80E+02 n	N/A		NO	BSL
	207-08-9	BENZO[K]FLUORANTHENE	7.40E-02 J	9.50E+00	mg/kg	MP06	MP06-000005	58 / 73	1.80E-01 - 2.50E-01	9.50E+00	N/A	1.10E+01 c	N/A		NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	4.30E-02 J	1.40E+00	mg/kg	MP32; MP31	MP32-000005; MP31-000005	46 / 73	1.80E-01 - 1.00E+00	1.40E+00	N/A	N/A	N/A		NO	NTX
	92-52-4	BIPHENYL	1.50E-01 J	2.50E-01 J	mg/kg	OD04	OD04-000005	2 / 73	1.80E-01 - 2.60E-01	2.50E-01	N/A	4.70E+00 n	N/A		NO	BSL
	117-81-7	**BIS(2-ETHYLHEXYL) PHTHALATE**	**6.60E-02 J**	**1.80E+02**	**mg/kg**	**WASD07**	**WASD07-000005**	**59 / 73**	**1.90E-01 - 2.20E-01**	**1.80E+02**	**N/A**	**3.90E+01 c**	**N/A**		**YES**	**ASL**
	105-60-2	CAPROLACTAM	1.00E-01 J	2.50E-01 J	mg/kg	MP13	MP13-000005	10 / 73	3.50E-01 - 2.00E+00	2.50E-01	N/A	3.10E+03 n	N/A		NO	BSL
	86-74-8	CARBAZOLE	7.00E-02 J	3.20E+00	mg/kg	MP29	MP29-000005	10 / 73	3.50E-01 - 5.00E-01	3.20E+00	N/A	N/A	N/A		NO	NTX
	218-01-9	CHRYSENE	1.30E-01 J	1.55E+01	mg/kg	OD04	OD04-000005	60 / 73	1.80E-01 - 2.50E-01	1.55E+01	N/A	1.10E+02 c	N/A		NO	BSL
	53-70-3	**DIBENZ[A,H]ANTHRACENE**	**1.40E-01 J**	**3.10E+00**	**mg/kg**	**MP06**	**MP06-000005**	**23 / 73**	**1.80E-01 - 2.60E-01**	**3.10E+00**	**N/A**	**1.10E-01 c**	**N/A**		**YES**	**ASL**
	132-64-9	DIBENZOFURAN	6.70E-02 J	1.80E+00	mg/kg	MP29	MP29-000005	9 / 73	1.80E-01 - 2.60E-01	1.80E+00	N/A	7.30E+00 n	N/A		NO	BSL
	131-11-3	DIMETHYL PHTHALATE	1.80E-01	2.00E+00	mg/kg	MP32	MP32-000005	8 / 73	1.80E-01 - 2.60E-01	2.00E+00	N/A	N/A	N/A		NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	1.50E-01 J	6.20E+00	mg/kg	MP49	MP49-000005	38 / 73	1.80E-01 - 1.00E+00	6.20E+00	N/A	6.30E+02 n	N/A		NO	BSL
	117-84-0	DI-N-OCTYL PHTHALATE	1.10E-01 J	4.20E-01	mg/kg	MP25	MP25-000005	4 / 73	3.50E-01 - 2.00E+00	4.20E-01	N/A	6.30E+01 n	N/A		NO	BSL
	206-44-0	FLUORANTHENE	5.60E-02 J	3.12E+01	mg/kg	OD04	OD04-000005	60 / 73	1.80E-01 - 4.60E-01	3.12E+01	N/A	2.40E+02 n	N/A		NO	BSL
	86-73-7	FLUORENE	1.20E-01 J	2.63E+00 J	mg/kg	OD04	OD04-000005	9 / 73	1.80E-01 - 2.50E-01	2.63E+00	N/A	2.40E+02 n	N/A		NO	BSL
	193-39-5	**INDENO[1,2,3-CD]PYRENE**	**8.50E-02 J**	**9.50E+00**	**mg/kg**	**MP06**	**MP06-000005**	**52 / 73**	**1.80E-01 - 2.50E-01**	**9.50E+00**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	91-20-3	NAPHTHALENE	1.35E-01 J	1.90E+00	mg/kg	MP29	MP29-000005	7 / 73	1.80E-01 - 2.50E-01	1.90E+00	N/A	3.80E+00 c	N/A		NO	BSL
	85-01-8	PHENANTHRENE	5.60E-02 J	2.35E+01	mg/kg	OD04	OD04-000005	49 / 73	1.80E-01 - 2.30E-01	2.35E+01	N/A	1.80E+02 n	N/A		NO	BSL
	108-95-2	PHENOL	7.30E-01	7.30E-01	mg/kg	HSTP10	HSTP10-000005	1 / 73	3.50E-01 - 2.00E+00	7.30E-01	N/A	1.90E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	9.00E-02 J	2.62E+01	mg/kg	OD04	OD04-000005	60 / 73	1.80E-01 - 2.40E-01	2.62E+01	N/A	1.80E+02 n	N/A		NO	BSL
	72-55-9	4,4'-DDE	1.10E-03 J	2.00E-03 J	mg/kg	OD01	OD01-000005	2 / 56	3.55E-03 - 4.60E-03	2.00E-03	N/A	2.00E+00 c	N/A		NO	BSL
	50-29-3	4,4'-DDT	1.50E-03 J	1.50E-03 J	mg/kg	OD02	OD02-000005	1 / 56	3.55E-03 - 5.00E-03	1.50E-03	N/A	1.90E+00 c	N/A		NO	BSL
	319-84-6	ALPHA-BHC	2.00E-03 J+	2.00E-03 J+	mg/kg	MP09	MP09-000005	1 / 56	1.80E-03 - 2.50E-03	2.00E-03	N/A	8.60E-02 c	N/A		NO	BSL
	33213-65-9	ENDOSULFAN II	4.80E-03	5.90E-02	mg/kg	OD03	OD03-000005	4 / 56	3.55E-03 - 4.59E-03	5.90E-02	N/A	4.70E+01	N/A		NO	BSL
	72-20-8	ENDRIN	2.60E-03 J	2.60E-03 J	mg/kg	OD01	OD01-000005	1 / 56	3.55E-03 - 4.60E-03	2.60E-03	N/A	1.90E+00 n	N/A		NO	BSL
	58-89-9	GAMMA-BHC (LINDANE)	2.70E-03	2.70E-03	mg/kg	OD07	OD07-000005	1 / 56	1.80E-03 - 2.50E-03	2.70E-03	N/A	5.70E-01 c	N/A		NO	BSL
	76-44-8	HEPTACHLOR	1.40E-03 J	1.40E-03 J	mg/kg	OD03	OD03-000005	1 / 56	1.80E-03 - 2.50E-03	1.40E-03	N/A	1.30E-01 c	N/A		NO	BSL
	12672-29-6	**AROCLOR-1248**	**6.20E-02 J**	**2.40E+01 J+**	**mg/kg**	**HSTP05**	**HSTP05-000005**	**55 / 77**	**3.60E-02 - 5.50E-02**	**2.40E+01**	**N/A**	**2.30E-01 c**	**N/A**		**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**5.20E-02 J-**	**2.40E+00 J**	**mg/kg**	**WASD07**	**WASD07-000005**	**3 / 77**	**3.50E-02 - 4.90E-02**	**2.40E+00**	**N/A**	**1.20E-01 n**	**N/A**		**YES**	**ASL**
	11096-82-5	**AROCLOR-1260**	**3.30E-02 J**	**3.20E+01**	**mg/kg**	**MP46**	**MP46-000005**	**69 / 77**	**3.90E-02 - 4.60E-02**	**3.20E+01**	**N/A**	**2.40E-01 c**	**N/A**		**YES**	**ASL**
	NA	**TEQ for PCB Congeners [7]**	**2.36E-04**	**2.36E-04**	**mg/kg**	**WASD07**	**WASD07-000005**	**1 / 1**	**N/A**	**2.36E-04**	**N/A**	**4.80E-06 c**	**N/A**		**YES**	**ASL**
	NA	**High Risk PCBs [8]**	**1.17E+01**	**1.17E+01**	**mg/kg**	**WASD07**	**WASD07-000005**	**1 / 1**	**N/A**	**1.17E+01**	**N/A**	**2.30E-01 c**	**N/A**		**YES**	**ASL**
	NA	**2,3,7,8-TCDD TEQ [9]**	**1.46E-05**	**7.15E-04**	**mg/kg**	**MP46**	**MP46-000005**	**10 / 10**	**N/A**	**7.15E-04**	**N/A**	**4.80E-06 c**	**N/A**		**YES**	**ASL**
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**3.55E+03**	**1.24E+06 J-**	**mg/kg**	**MP06**	**MP06-000005**	**77 / 77**	**N/A**	**1.24E+06**	**N/A**	**7.70E+03 n**	**N/A**		**YES**	**ASL**
	7440-36-0	**ANTIMONY**	**5.20E-01 J**	**1.85E+03**	**mg/kg**	**MP10**	**MP10-000005**	**44 / 77**	**6.50E+00 - 1.11E+01**	**1.85E+03**	**N/A**	**3.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-38-2	**ARSENIC**	**6.40E-01 J**	**9.68E+01**	**mg/kg**	**MP13**	**MP13-000005**	**77 / 77**	**N/A**	**9.68E+01**	**N/A**	**6.80E-01 c**	**N/A**		**YES**	**ASL**
	7440-39-3	**BARIUM**	**2.71E+01**	**1.95E+03**	**mg/kg**	**MP23**	**MP23-000005**	**77 / 77**	**N/A**	**1.95E+03**	**N/A**	**1.50E+03 n**	**N/A**		**YES**	**ASL**
	7440-41-7	BERYLLIUM	2.60E-02 J	1.47E+01	mg/kg	MP40	MP40-000005	47 / 77	5.40E-01 - 9.20E-01	1.47E+01	N/A	1.60E+01 n	N/A		NO	BSL
	7440-43-9	**CADMIUM**	**3.00E-01 J**	**1.32E+02 J-**	**mg/kg**	**MP03**	**MP03-000005**	**72 / 77**	**5.60E-01 - 6.40E-01**	**1.32E+02**	**N/A**	**7.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-70-2	CALCIUM METAL	5.01E+02 J	4.24E+04	mg/kg	MP21	MP21-000005	77 / 77	N/A	4.24E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	9.10E+00 J	8.15E+03	mg/kg	MP30	MP30-000005	77 / 77	N/A	8.15E+03	N/A	1.20E+04 n	N/A		NO	BSL

Table 2.1
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current
Medium: Peck Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-47-3	**CHROMIUM[6]**	**9.10E+00 J**	**8.15E+03**	**mg/kg**	**MP30**	**MP30-000005**	**77 / 77**	**N/A**	**8.15E+03**	**N/A**	**3.00E-01 c**	**N/A**		**YES**	**ASL**
	18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**4.90E-01**	**4.74E+01**	**mg/kg**	**MP30**	**MP30-000005**	**10 / 15**	**4.30E-01 - 5.80E-01**	**4.74E+01**	**N/A**	**3.00E-01 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**3.40E+00 J**	**5.43E+03**	**mg/kg**	**MP30**	**MP30-000005**	**63 / 77**	**5.70E+00 - 9.20E+00**	**5.43E+03**	**N/A**	**2.30E+00 n**	**N/A**		**YES**	**ASL**
	7440-50-8	**COPPER**	**1.19E+01 J+**	**1.83E+05 J-**	**mg/kg**	**MP06**	**MP06-000005**	**77 / 77**	**N/A**	**1.83E+05**	**N/A**	**3.10E+02 n**	**N/A**		**YES**	**ASL**
	57-12-5	CYANIDE	5.70E-01 U	9.60E-01	mg/kg	MP15	MP15-000005	12 / 77	5.40E-01 - 9.20E-01	9.60E-01	N/A	2.30E+00 n	N/A		NO	BSL
	7439-89-6	**IRON**	**3.56E+03**	**1.58E+06 J-**	**mg/kg**	**MP06**	**MP06-000005**	**77 / 77**	**N/A**	**1.58E+06**	**N/A**	**5.50E+03 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**1.95E+01 J**	**1.21E+05**	**mg/kg**	**MP10**	**MP10-000005**	**77 / 77**	**N/A**	**1.21E+05**	**N/A**	**2.00E+02**	**N/A**		**YES**	**ASL**
	7439-95-4	MAGNESIUM	4.56E+02 J	6.53E+03	mg/kg	MP40	MP40-000005	77 / 77	N/A	6.53E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**1.49E+01 J**	**1.86E+03 J**	**mg/kg**	**MP24**	**MP24-000005**	**77 / 77**	**N/A**	**1.86E+03**	**N/A**	**1.80E+02 n**	**N/A**		**YES**	**ASL**
	7439-97-6	**MERCURY**	**1.70E-02 J-**	**2.94E+01 J-**	**mg/kg**	**HSTP09**	**HSTP09-000005**	**71 / 75**	**1.30E-01 - 1.40E-01**	**2.94E+01**	**N/A**	**1.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-02-0	**NICKEL**	**5.90E+00**	**3.25E+03**	**mg/kg**	**MP30**	**MP30-000005**	**76 / 77**	**5.40E+00 - 5.40E+00**	**3.25E+03**	**N/A**	**1.50E+02 n**	**N/A**		**YES**	**ASL**
	7440-09-7	POTASSIUM	2.16E+01	3.54E+03	mg/kg	MP40	MP40-000005	70 / 77	5.63E+02 - 9.23E+02	3.54E+03	N/A	N/A	N/A		NO	NUT
	7782-49-2	SELENIUM	8.80E-01 J+	2.30E+01 J	mg/kg	MP19	MP19-000005	53 / 77	3.80E+00 - 6.50E+00	2.30E+01	N/A	3.90E+01 n	N/A		NO	BSL
	7440-22-4	**SILVER**	**6.30E-02 J**	**1.11E+02 J-**	**mg/kg**	**MP06**	**MP06-000005**	**32 / 77**	**1.10E+00 - 1.70E+00**	**1.11E+02**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-23-5	SODIUM	5.43E+02 J	2.68E+03	mg/kg	MP40	MP40-000005	25 / 77	5.38E+02 - 9.23E+02	2.68E+03	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**1.90E-01 J-**	**1.03E+01**	**mg/kg**	**WASD07**	**WASD07-000005**	**5 / 72**	**2.70E+00 - 4.60E+00**	**1.03E+01**	**N/A**	**7.80E-02 n**	**N/A**		**YES**	**ASL**
	7440-62-2	**VANADIUM (FUME OR DUST)**	**9.00E+00**	**1.82E+03**	**mg/kg**	**MP34**	**MP34-000005**	**77 / 77**	**N/A**	**1.82E+03**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-66-6	**ZINC**	**3.92E+01 J**	**1.27E+05 J-**	**mg/kg**	**MP06**	**MP06-000005**	**77 / 77**	**N/A**	**1.27E+05**	**N/A**	**2.30E+03 n**	**N/A**		**YES**	**ASL**
	13966-02-4	BERYLLIUM-7	2.47E-01	3.29E-01	pCi/g	RAD17	RAD17-000005	2 / 5	2.16E-01 - 2.42E-01	3.29E-01	N/A	5.39E-01 c	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**5.83E-01 J**	**1.60E+00 J**	**pCi/g**	**OD07**	**OD07-000005**	**28 / 31**	**1.22E+00 - 1.60E+00**	**1.60E+00**	**N/A**	**1.76E-02 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**5.54E-01 J**	**5.50E+02 J**	**pCi/g**	**RAD07**	**RAD07**	**34 / 34**	**N/A**	**5.50E+02**	**N/A**	**1.53E-02 c**	**N/A**		**YES**	**ASL**
	10045-97-3	**CESIUM-137**	**2.15E-02**	**2.47E-01**	**pCi/g**	**RAD20**	**RAD20-000005**	**31 / 32**	**3.25E-02 - 3.25E-02**	**2.47E-01**	**N/A**	**4.70E-02 c**	**N/A**		**YES**	**ASL**
	14255-04-0	**LEAD-210**	**1.39E+00**	**3.53E+02 J**	**pCi/g**	**RAD07**	**RAD07**	**10 / 10**	**N/A**	**3.53E+02**	**N/A**	**1.77E-01 c**	**N/A**		**YES**	**ASL**
	15092-94-1	**LEAD-212**	**3.27E-01 J**	**1.42E+00 J**	**pCi/g**	**RAD08**	**OD07-000005**	**30 / 34**	**4.67E-01 - 6.75E-01**	**1.42E+00**	**N/A**	**1.64E-02 c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**6.65E-01 J**	**5.96E+02 J**	**pCi/g**	**RAD19**	**RAD19-000005**	**34 / 34**	**N/A**	**5.96E+02**	**N/A**	**1.35E-02 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**2.36E+00**	**1.77E+01**	**pCi/g**	**OD05**	**OD05-000005**	**34 / 34**	**N/A**	**1.77E+01**	**N/A**	**1.57E-01 c**	**N/A**		**YES**	**ASL**
	PA-234M	**PROTACTINIUM-234M**	**1.63E+00 J**	**2.73E+00 J**	**pCi/g**	**RAD08**	**RAD08**	**4 / 5**	**1.65E+00 - 1.65E+00**	**2.73E+00**	**N/A**	**1.31E-02 c**	**N/A**		**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**1.16E+00 J**	**2.67E+00 J**	**pCi/g**	**OD07**	**OD07-000005**	**8 / 8**	**N/A**	**2.67E+00**	**N/A**	**1.33E-02 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**3.87E-01**	**1.44E+00**	**pCi/g**	**OD02**	**OD02-000005**	**32 / 35**	**4.05E-01 - 6.59E-01**	**1.44E+00**	**N/A**	**1.02E-02 c**	**N/A**		**YES**	**ASL**
	14913-50-9	**THALLIUM-208**	**1.11E-01 J**	**4.35E-01 J**	**pCi/g**	**OD07**	**OD07-000005**	**31 / 31**	**N/A**	**4.35E-01**	**N/A**	**6.83E-03 c**	**N/A**		**YES**	**ASL**
	15065-10-8	**THORIUM-234**	**6.62E-01 J**	**1.29E+00 J**	**pCi/g**	**OD02**	**OD02-000005**	**8 / 16**	**1.04E+00 - 1.20E+01**	**1.29E+00**	**N/A**	**1.31E-02 c**	**N/A**		**YES**	**ASL**
	15117-96-1	**URANIUM-235**	**6.63E-02 J**	**2.15E-01 J**	**pCi/g**	**RAD13**	**RAD13**	**5 / 7**	**6.45E-02 - 1.54E-01**	**2.15E-01**	**N/A**	**4.63E-02 c**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for residential soil (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1).
RSL value for xylenes used for m,p-xylene.
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene.
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 30.48 acres (200,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

[6] Due to limited hexavalent chromium specization; chromium concentrations screened against both hexavalent and trivalent chromium residential soil RSL
[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

Table 2.2
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Peck																
	87-61-6	1,2,3-TRICHLOROBENZENE	3.30E-03 J	4.20E+00	mg/kg	DU21TP2	DU21TP2-040080	3 / 232	4.50E-03 - 2.30E-02	4.20E+00	N/A	6.30E+00 n	N/A		NO	BSL
	120-82-1	**1,2,4-TRICHLOROBENZENE**	**2.40E-03 J**	**3.60E+01**	**mg/kg**	**DU21TP2**	**DU21TP2-040080**	**12 / 233**	**4.50E-03 - 2.30E-02**	**3.60E+01**	**N/A**	**5.80E+00 n**	**N/A**		**YES**	**ASL**
	95-50-1	1,2-DICHLOROBENZENE	4.90E-03 J	4.40E-02 J-	mg/kg	DU11TP2	DU11TP2-005020	4 / 233	4.50E-03 - 2.30E-02	4.40E-02	N/A	1.80E+02 n	N/A		NO	BSL
	541-73-1	1,3-DICHLOROBENZENE	3.10E-03 J	1.50E+01	mg/kg	DU11TP2	DU11TP2-005020	8 / 233	4.50E-03 - 2.30E-02	1.50E+01	N/A	N/A	N/A		NO	NTX
	106-46-7	**1,4-DICHLOROBENZENE**	**3.70E-03 J**	**3.50E+01**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**9 / 233**	**4.50E-03 - 2.30E-02**	**3.50E+01**	**N/A**	**2.60E+00 c**	**N/A**		**YES**	**ASL**
	78-93-3	2-BUTANONE	7.30E-03 J	3.10E-01 J+	mg/kg	DU9TP1	DU9TP1-040080	21 / 235	9.00E-03 - 3.60E-02	3.10E-01	N/A	2.70E+03 n	N/A		NO	BSL
	108-10-1	4-METHYL-2-PENTANONE	1.80E-02	1.80E-02	mg/kg	DU11TP2	DU11TP2-005020	1 / 235	9.00E-03 - 4.50E-02	1.80E-02	N/A	3.30E+03 n	N/A		NO	BSL
	67-64-1	ACETONE	5.30E-03 J	3.40E-01 J+	mg/kg	DU9TP1	DU9TP1-040080	131 / 235	9.10E-03 - 2.90E-02	3.40E-01	N/A	6.10E+03 n	N/A		NO	BSL
	71-43-2	BENZENE	2.50E-03 J	2.60E-01	mg/kg	DU11TP2	DU11TP2-005020	9 / 235	4.50E-03 - 1.80E-02	2.60E-01	N/A	1.20E+00 c	N/A		NO	BSL
	75-15-0	CARBON DISULFIDE	2.90E-03 J	1.10E-02 J	mg/kg	HSTP12	HSTP12-040080	9 / 235	4.50E-03 - 2.30E-02	1.10E-02	N/A	7.70E+01 n	N/A		NO	BSL
	108-90-7	**CHLOROBENZENE**	**2.60E-03 J**	**3.40E+01**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**7 / 235**	**4.50E-03 - 2.30E-02**	**3.40E+01**	**N/A**	**2.80E+01 n**	**N/A**		**YES**	**ASL**
	110-82-7	CYCLOHEXANE	5.20E-03 J	6.40E-03 J+	mg/kg	DU11TP2	DU11TP2-020040	2 / 235	4.50E-03 - 2.30E-02	6.40E-03	N/A	6.50E+02 n	N/A		NO	BSL
	100-41-4	ETHYLBENZENE	2.50E-03 J	2.30E+00	mg/kg	DU11TP2	DU11TP2-005020	14 / 235	4.50E-03 - 1.80E-02	2.30E+00	N/A	5.80E+00 c	N/A		NO	BSL
	98-82-8	ISOPROPYLBENZENE (CUMENE)	1.45E-03 J	5.00E-02	mg/kg	DU17TP2	DU17TP2-040080	10 / 235	4.50E-03 - 1.80E-02	5.00E-02	N/A	1.90E+02 n	N/A		NO	BSL
	179601-23-1	m,p-XYLENE	2.50E-03 J	6.80E+00	mg/kg	DU11TP2	DU11TP2-005020	23 / 235	4.50E-03 - 1.80E-02	6.80E+00	N/A	5.50E+01 n	N/A		NO	BSL
	79-20-9	METHYL ACETATE	2.70E-03 J	2.90E-02	mg/kg	MW22	MW-22-020040	3 / 235	4.50E-03 - 2.30E-02	2.90E-02	N/A	7.80E+03 n	N/A		NO	BSL
	1634-04-4	METHYL TERT-BUTYL ETHER	2.50E-03 J	1.30E-02	mg/kg	HSTP11	HSTP11-020040	6 / 235	4.50E-03 - 2.30E-02	1.30E-02	N/A	4.70E+01 c	N/A		NO	BSL
	108-87-2	METHYLCYLOHEXANE	2.40E-03 J	4.40E-02 J+	mg/kg	DU11TP2	DU11TP2-020040	10 / 235	4.50E-03 - 2.30E-02	4.40E-02	N/A	N/A	N/A		NO	NTX
	75-09-2	METHYLENE CHLORIDE	2.10E-03 J	9.20E-03	mg/kg	HSTP09	HSTP09-040080	69 / 235	4.50E-03 - 2.30E-02	9.20E-03	N/A	3.50E+01 n	N/A		NO	BSL
	95-47-6	o-XYLENE	2.50E-03 J	1.10E+00	mg/kg	DU11TP2	DU11TP2-005020	20 / 235	4.50E-03 - 1.80E-02	1.10E+00	N/A	6.50E+01 n	N/A		NO	BSL
	100-42-5	STYRENE (MONOMER)	2.20E-02	2.20E-02	mg/kg	DU11TP2	DU11TP2-005020	1 / 235	4.50E-03 - 2.30E-02	2.20E-02	N/A	6.00E+02 n	N/A		NO	BSL
	108-88-3	TOLUENE	2.30E-03 J	7.90E-02 J+	mg/kg	DU9TP1	DU9TP1-040080	13 / 235	4.50E-03 - 1.80E-02	7.90E-02	N/A	4.90E+02 n	N/A		NO	BSL
	95-94-3	1,2,4,5-TETRACHLOROBENZENE	1.40E+00	1.40E+00	mg/kg	DU21TP2	DU21TP2-040080	1 / 309	1.80E-01 - 1.00E+00	1.40E+00	N/A	2.30E+00 n	N/A		NO	BSL
	99-35-4	1,3,5-TRINITROBENZENE	2.40E+00 J	2.40E+00 J	mg/kg	DU9TP1	DU9TP1-040080	1 / 60	2.50E-01 - 2.50E-01	2.40E+00	N/A	2.20E+02 n	N/A		NO	BSL
	123-91-1	1,4-DIOXANE	1.30E-02 J	1.30E-02 J	mg/kg	DU17TP2	DU17TP2-040080	1 / 304	7.10E-02 - 1.70E-01	1.30E-02	N/A	5.30E+00 c	N/A		NO	BSL
	58-90-2	2,3,4,6-TETRACHLOROPHENOL	1.20E-01 J	1.80E-01 J	mg/kg	HSTP05	HSTP05-005020	2 / 309	1.80E-01 - 1.00E+00	1.80E-01	N/A	1.90E+02 n	N/A		NO	BSL
	95-95-4	2,4,5-TRICHLOROPHENOL	2.30E-01	2.30E-01	mg/kg	DU21TP2	DU21TP2-040080	1 / 309	1.80E-01 - 1.00E+00	2.30E-01	N/A	6.30E+02 n	N/A		NO	BSL
	120-83-2	2,4-DICHLOROPHENOL	1.50E-01 J	1.50E-01 J	mg/kg	DU21TP2	DU21TP2-040080	1 / 309	1.80E-01 - 1.00E+00	1.50E-01	N/A	1.90E+01 n	N/A		NO	BSL
	105-67-9	2,4-DIMETHYLPHENOL	1.20E-01 J	1.30E+00	mg/kg	DU22TP1	DU22TP1-005020	4 / 309	1.80E-01 - 1.00E+00	1.30E+00	N/A	1.30E+02 n	N/A		NO	BSL
	51-28-5	2,4-DINITROPHENOL	4.40E-02 J+	4.40E-02 J+	mg/kg	MW17	MW-17-020040	1 / 297	3.50E-01 - 9.50E-01	4.40E-02	N/A	1.30E+01 n	N/A		NO	BSL
	121-14-2	2,4-DINITROTOLUENE	5.40E-02 J	5.40E-02 J	mg/kg	DU17TP2	DU17TP2-040080	1 / 312	1.80E-01 - 1.00E+00	5.40E-02	N/A	1.70E+00 c	N/A		NO	BSL
	606-20-2	2,6-DINITROTOLUENE	2.70E-01	3.30E-01	mg/kg	MP30	MP30-000005	3 / 312	1.80E-01 - 1.00E+00	3.30E-01	N/A	3.60E-01 c	N/A		NO	BSL
	95-57-8	2-CHLOROPHENOL	6.90E-02 J	6.90E-02 J	mg/kg	DU21TP2	DU21TP2-040080	1 / 307	1.80E-01 - 1.00E+00	6.90E-02	N/A	3.90E+01 n	N/A		NO	BSL
	95-48-7	2-METHLYPHENOL	4.00E-02 J	2.10E-01 J	mg/kg	HSTP04	HSTP04-005020	3 / 309	3.50E-01 - 2.00E+00	2.10E-01	N/A	3.20E+02 n	N/A		NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	2.60E-02 J	2.70E+00	mg/kg	HSTP02	HSTP02-020040	64 / 309	1.80E-01 - 1.00E+00	2.70E+00	N/A	2.40E+01 n	N/A		NO	BSL
	88-74-4	2-NITROANILINE	8.60E-02 J	8.60E-02 J	mg/kg	DU17TP2	DU17TP2-040080	1 / 304	1.80E-01 - 4.30E-01	8.60E-02	N/A	6.30E+01 n	N/A		NO	BSL
	99-09-2	3-NITROANILINE	6.80E-02 J	6.80E-02 J	mg/kg	DU17TP2	DU17TP2-040080	1 / 304	3.50E-01 - 8.40E-01	6.80E-02	N/A	N/A	N/A		NO	NTX
	534-52-1	4,6-DINITRO-2-METHYLPHENOL	5.20E-02 J	4.30E-01 J	mg/kg	DU22TP1	DU22TP1-040080	2 / 278	3.50E-01 - 2.00E+00	4.30E-01	N/A	5.10E-01 n	N/A		NO	BSL
	19406-51-0	4-AMINO-2,6-DINITROTOLUENE	2.30E+00 J	2.30E+00 J	mg/kg	DU9TP1	DU9TP1-040080	1 / 60	2.50E-01 - 2.50E-01	2.30E+00	N/A	1.50E+01 n	N/A		NO	BSL
	106-47-8	4-CHLOROANILINE	1.90E-01 J	1.90E-01 J	mg/kg	MP06	MP06-000005	1 / 306	3.50E-01 - 2.00E+00	1.90E-01	N/A	2.70E+00 c	N/A		NO	BSL
	106-44-5	4-METHLYPHENOL	3.90E-02 J	6.00E-01	mg/kg	DU22TP1	DU22TP1-005020	11 / 309	3.50E-01 - 2.00E+00	6.00E-01	N/A	6.30E+02 n	N/A		NO	BSL
	83-32-9	ACENAPHTHENE	3.00E-02 J	4.90E+00	mg/kg	HSTP02	HSTP02-020040	86 / 309	1.80E-01 - 4.30E-01	4.90E+00	N/A	3.60E+02 n	N/A		NO	BSL
	208-96-8	ACENAPHTHYLENE	2.40E-02 J	7.40E-01	mg/kg	HSTP09	HSTP09-005020	36 / 309	1.80E-01 - 1.00E+00	7.40E-01	N/A	3.60E+02 n	N/A		NO	BSL
	98-86-2	ACETOPHENONE	4.20E-02 J	2.40E+00	mg/kg	HSTP10	HSTP10-000005	45 / 309	3.50E-01 - 2.00E+00	2.40E+00	N/A	7.80E+02 n	N/A		NO	BSL
	120-12-7	ANTHRACENE	2.90E-02 J	4.80E+00	mg/kg	OD04	OD04-000005	128 / 309	1.80E-01 - 4.90E-01	4.80E+00	N/A	1.80E+03 n	N/A		NO	BSL
	100-52-7	BENZALDEHYDE	5.40E-02 J	2.90E+00	mg/kg	HSTP10	HSTP10-000005	13 / 309	3.50E-01 - 2.00E+00	2.90E+00	N/A	1.70E+02 c	N/A		NO	BSL
	56-55-3	**BENZO[A]ANTHRACENE**	**3.10E-02 J**	**1.54E+01**	**mg/kg**	**OD04**	**OD04-000005**	**201 / 309**	**1.80E-01 - 3.70E-01**	**1.54E+01**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	50-32-8	**BENZO[A]PYRENE**	**4.10E-02**	**1.20E+01**	**mg/kg**	**MP06**	**MP06-000005**	**196 / 309**	**1.80E-01 - 4.90E-01**	**1.20E+01**	**N/A**	**1.10E-01 c**	**N/A**		**YES**	**ASL**
	205-99-2	**BENZO[B]FLUORANTHENE**	**4.50E-02 J**	**1.91E+01**	**mg/kg**	**OD04**	**OD04-000005**	**208 / 309**	**1.80E-01 - 4.90E-01**	**1.91E+01**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	191-24-2	BENZO[G,H,I]PERYLENE	2.60E-02 J	1.10E+01	mg/kg	MP06	MP06-000005	183 / 309	1.80E-01 - 4.90E-01	1.10E+01	N/A	1.80E+02 n	N/A		NO	BSL
	207-08-9	BENZO[K]FLUORANTHENE	4.10E-02 J	9.50E+00	mg/kg	MP06	MP06-000005	178 / 309	1.80E-01 - 4.90E-01	9.50E+00	N/A	1.10E+01 c	N/A		NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	4.30E-02 J	1.40E+00	mg/kg	MP31; MP32	MP31-000005; MP32-000005	77 / 309	1.80E-01 - 1.00E+00	1.40E+00	N/A	2.90E+02 c	N/A		NO	BSL
	92-52-4	BIPHENYL	4.40E-02 J	6.40E-01	mg/kg	HSTP02	HSTP02-020040	22 / 309	1.80E-01 - 1.00E+00	6.40E-01	N/A	4.70E+00 n	N/A		NO	BSL
	117-81-7	**BIS(2-ETHYLHEXYL) PHTHALATE**	**4.10E-02 J**	**1.80E+02**	**mg/kg**	**WASD07**	**WASD07-000005**	**164 / 309**	**1.90E-01 - 4.30E-01**	**1.80E+02**	**N/A**	**3.90E+01 c**	**N/A**		**YES**	**ASL**
	105-60-2	CAPROLACTAM	1.00E-01 J	6.70E+00	mg/kg	DU10TP1	DU10TP1-040080	12 / 309	3.50E-01 - 2.00E+00	6.70E+00	N/A	3.10E+03 n	N/A		NO	BSL
	86-74-8	CARBAZOLE	4.30E-02 J	3.20E+00	mg/kg	MP29	MP29-000005	74 / 309	1.90E-01 - 9.50E-01	3.20E+00	N/A	N/A	N/A		NO	NTX
	218-01-9	CHRYSENE	3.80E-02 J	1.55E+01	mg/kg	OD04	OD04-000005	206 / 309	1.80E-01 - 3.70E-01	1.55E+01	N/A	1.10E+02 c	N/A		NO	BSL

Table 2.2
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening Toxicity Value [4]	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	53-70-3	**DIBENZ[A,H]ANTHRACENE**	**2.60E-02 J**	**3.10E+00**	**mg/kg**	**MP06**	**MP06-000005**	**96 / 309**	**1.80E-01 - 4.90E-01**	**3.10E+00**	**N/A**	**1.10E-01 c**	**N/A**		**YES**	**ASL**
	132-64-9	DIBENZOFURAN	2.70E-02 J	2.50E+00	mg/kg	HSTP02	HSTP02-020040	70 / 309	1.80E-01 - 4.30E-01	2.50E+00	N/A	7.30E+00 n	N/A		NO	BSL
	84-66-2	DIETHYL PHTHALATE	4.60E-02 J	1.40E-01 J	mg/kg	DU22TP1; DU21TP2	DU22TP1-040080; DU21TP2-040080	12 / 309	1.80E-01 - 1.00E+00	1.40E-01	N/A	5.10E+03 n	N/A		NO	BSL
	131-11-3	DIMETHYL PHTHALATE	4.90E-02 J	2.30E+00	mg/kg	DU22TP1	DU22TP1-040080	220 / 309	1.80E-01 - 2.60E-01	2.30E+00	N/A	N/A	N/A		NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	3.50E-02 J	6.20E+00	mg/kg	MP49	MP49-000005	85 / 309	1.80E-01 - 1.00E+00	6.20E+00	N/A	6.30E+02 n	N/A		NO	BSL
	117-84-0	DI-N-OCTYL PHTHALATE	7.70E-02 J	8.20E-01	mg/kg	DU17TP1	DU17TP1-005020	7 / 309	3.50E-01 - 2.00E+00	8.20E-01	N/A	6.30E+01 n	N/A		NO	BSL
	206-44-0	FLUORANTHENE	3.80E-02 J	3.12E+01	mg/kg	OD04	OD04-000005	218 / 309	1.80E-01 - 7.10E-01	3.12E+01	N/A	2.40E+02 n	N/A		NO	BSL
	86-73-7	FLUORENE	3.40E-02 J	4.30E+00	mg/kg	HSTP02	HSTP02-020040	84 / 309	1.80E-01 - 4.30E-01	4.30E+00	N/A	2.40E+02 n	N/A		NO	BSL
	118-74-1	HEXACHLOROBENZENE	1.30E-01 J	1.30E-01 J	mg/kg	MW17	MW-17-020040	1 / 309	1.80E-01 - 1.00E+00	1.30E-01	N/A	2.10E-01 c	N/A		NO	BSL
	193-39-5	**INDENO[1,2,3-CD]PYRENE**	**4.30E-02 J**	**9.50E+00**	**mg/kg**	**MP06**	**MP06-000005**	**178 / 309**	**1.80E-01 - 4.90E-01**	**9.50E+00**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	91-20-3	NAPHTHALENE	2.50E-02 J	3.80E+00	mg/kg	DU14TP2	DU14TP2-020040	73 / 309	1.80E-01 - 1.00E+00	3.80E+00	N/A	3.80E+00 c	N/A		NO	BSL
	86-30-6	N-NITROSODIPHENYLAMINE	4.60E-02 J	4.60E-02 J	mg/kg	DU19TP1	DU19TP1-005020	1 / 309	1.80E-01 - 1.00E+00	4.60E-02	N/A	1.10E+02 c	N/A		NO	BSL
	85-01-8	PHENANTHRENE	3.30E-02 J	2.35E+01	mg/kg	OD04	OD04-000005	194 / 309	1.80E-01 - 4.90E-01	2.35E+01	N/A	1.80E+02 n	N/A		NO	BSL
	108-95-2	PHENOL	4.10E-02 J	2.40E+00	mg/kg	HSTP04	HSTP04-005020	24 / 309	3.50E-01 - 2.00E+00	2.40E+00	N/A	1.90E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	4.20E-02 J	2.62E+01	mg/kg	OD04	OD04-000005	217 / 309	1.80E-01 - 3.70E-01	2.62E+01	N/A	1.80E+02 n	N/A		NO	BSL
	72-54-8	4,4'-DDD	2.30E-03 J-	1.30E-01 J	mg/kg	DU23TP2	DU23TP2-005020	18 / 292	1.80E-03 - 2.00E-02	1.30E-01	N/A	1.90E-01 n	N/A		NO	BSL
	72-55-9	4,4'-DDE	1.10E-03 J	1.80E+00 J	mg/kg	MW22	MW-22-005020	27 / 292	1.80E-03 - 9.50E-03	1.80E+00	N/A	2.00E+00 c	N/A		NO	BSL
	50-29-3	**4,4'-DDT**	**1.20E-03 J**	**1.10E+01**	**mg/kg**	**MW22**	**MW-22-005020**	**26 / 291**	**1.80E-03 - 9.50E-03**	**1.10E+01**	**N/A**	**1.90E+00 c**	**N/A**		**YES**	**ASL**
	309-00-2	ALDRIN	6.70E-04 J	3.10E-03 J+	mg/kg	MW19	MW-19-005020	6 / 291	9.40E-04 - 2.00E-02	3.10E-03	N/A	3.90E-02 c	N/A		NO	BSL
	319-84-6	ALPHA-BHC	6.70E-04 J+	4.50E-03 J+	mg/kg	MW22	MW-22-005020	6 / 292	9.40E-04 - 4.90E-03	4.50E-03	N/A	8.60E-02 c	N/A		NO	BSL
	319-85-7	BETA-BHC	6.10E-04 J	6.40E-03 J+	mg/kg	MW22	MW-22-005020	16 / 292	9.40E-04 - 4.90E-03	6.40E-03	N/A	3.00E-01 c	N/A		NO	BSL
	12789-03-6	CHLORDANE	6.60E-04	3.43E-01	mg/kg	MW19	MW-19-005020	22 / 291	N/A	3.43E-01	N/A	1.70E+00 c	N/A		NO	BSL
	319-86-8	DELTA-BHC	8.30E-04 J	7.20E-03	mg/kg	DU26TP2	DU26TP2-020040	3 / 292	9.40E-04 - 1.00E-02	7.20E-03	N/A	3.00E-01 c	N/A		NO	BSL
	60-57-1	**DIELDRIN**	**1.40E-03 J**	**1.70E+00 J**	**mg/kg**	**MW22**	**MW-22-005020**	**17 / 292**	**1.80E-03 - 9.50E-03**	**1.70E+00**	**N/A**	**3.40E-02 c**	**N/A**		**YES**	**ASL**
	959-98-8	ENDOSULFAN I	1.20E-03 J	4.80E-02 J+	mg/kg	MW22	MW-22-005020	4 / 292	9.40E-04 - 4.90E-03	4.80E-02	N/A	4.70E+01 n	N/A		NO	BSL
	33213-65-9	ENDOSULFAN II	1.80E-03 J	1.30E-01 J+	mg/kg	MW22	MW-22-005020	9 / 292	1.80E-03 - 9.50E-03	1.30E-01	N/A	4.70E+01 n	N/A		NO	BSL
	1031-07-8	ENDOSULFAN SULFATE	2.70E-03 J	8.20E-02 J+	mg/kg	MW22	MW-22-005020	6 / 292	1.80E-03 - 9.50E-03	8.20E-02	N/A	4.70E+01 n	N/A		NO	BSL
	72-20-8	ENDRIN	1.10E-03 J	8.40E-01 J	mg/kg	MW22	MW-22-005020	15 / 292	1.80E-03 - 9.50E-03	8.40E-01	N/A	1.90E+00 n	N/A		NO	BSL
	7421-93-4	ENDRIN ALDEHYDE	1.90E-03 J	1.70E+00 J	mg/kg	MW22	MW-22-005020	19 / 292	1.80E-03 - 9.50E-03	1.70E+00	N/A	1.90E+00 n	N/A		NO	BSL
	53494-70-5	ENDRIN KETONE	1.20E-03 J	3.70E-02 J+	mg/kg	MW22	MW-22-005020	10 / 292	1.80E-03 - 9.50E-03	3.70E-02	N/A	1.90E+00 n	N/A		NO	BSL
	58-89-9	GAMMA-BHC (LINDANE)	7.40E-04 J	1.50E-02 J	mg/kg	MW19	MW-19-040080	9 / 292	9.40E-04 - 1.00E-02	1.50E-02	N/A	5.70E-01 c	N/A		NO	BSL
	76-44-8	HEPTACHLOR	5.10E-04 J	8.50E-03 J+	mg/kg	MW19; MW22	MW-19-005020; MW-22-005020	12 / 292	9.40E-04 - 4.90E-03	8.50E-03	N/A	1.30E-01 c	N/A		NO	BSL
	1024-57-3	**HEPTACHLOR EPOXIDE**	**6.10E-04 J**	**3.90E-01 J**	**mg/kg**	**MW22**	**MW-22-005020**	**17 / 292**	**9.40E-04 - 4.90E-03**	**3.90E-01**	**N/A**	**7.00E-02 c**	**N/A**		**YES**	**ASL**
	72-43-5	METHOXYCHLOR	4.30E-03 J	1.70E-01 J+	mg/kg	MW22	MW-22-005020	6 / 292	9.40E-03 - 4.90E-02	1.70E-01	N/A	3.20E+01 n	N/A		NO	BSL
	12672-29-6	**AROCLOR-1248**	**6.20E-02 J**	**4.30E+03 J**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**83 / 321**	**3.50E-02 - 2.00E+00**	**4.30E+03**	**N/A**	**2.30E-01 c**	**N/A**		**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**1.30E-02 J**	**2.10E+03**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**140 / 321**	**3.50E-02 - 7.10E-02**	**2.10E+03**	**N/A**	**1.20E-01 n**	**N/A**		**YES**	**ASL**
	11096-82-5	**AROCLOR-1260**	**5.10E-03 J**	**8.60E+02**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**184 / 321**	**3.50E-02 - 7.10E-02**	**8.60E+02**	**N/A**	**2.40E-01 c**	**N/A**		**YES**	**ASL**
	11100-14-4	AROCLOR-1268	3.80E-02 J+	8.40E-02 J+	mg/kg	MW23	MW-23-020040	2 / 321	3.50E-02 - 2.00E+00	8.40E-02	N/A	2.40E-01 c	N/A		NO	BSL
	NA	**TEQ for PCB Congeners [7]**	**4.97E-09**	**1.64E-03**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**26 / 26**	**N/A**	**1.64E-03**	**N/A**	**4.80E-06 c**	**N/A**		**YES**	**ASL**
	NA	**High Risk PCBs [8]**	**3.06E-03**	**1.39E+03**	**mg/kg**	**DU11TP2**	**DU11TP2-005020**	**26 / 26**	**N/A**	**1.39E+03**	**N/A**	**2.30E-01 c**	**N/A**		**YES**	**ASL**
	NA	**2,3,7,8-TCDD TEQ [9]**	**1.43E-06**	**1.20E-03**	**mg/kg**	**MW22**	**MW-22-005020**	**45 / 45**	**N/A**	**1.20E-03**	**N/A**	**4.80E-06 c**	**N/A**		**YES**	**ASL**
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**6.33E+02**	**1.24E+06 J-**	**mg/kg**	**MP06**	**MP06-000005**	**320 / 320**	**N/A**	**1.24E+06**	**N/A**	**7.70E+03 n**	**N/A**		**YES**	**ASL**
	7440-36-0	**ANTIMONY**	**2.30E-01 J**	**1.85E+03**	**mg/kg**	**MP10**	**MP10-000005**	**187 / 320**	**4.80E+00 - 7.16E+02**	**1.85E+03**	**N/A**	**3.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-38-2	**ARSENIC**	**5.30E-01 J**	**1.61E+02 J**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**316 / 320**	**1.10E+00 - 1.20E+00**	**1.61E+02**	**N/A**	**6.80E-01 c**	**N/A**		**YES**	**ASL**
	7440-39-3	**BARIUM**	**8.60E+00 J**	**2.53E+03**	**mg/kg**	**DU22TP2**	**DU22TP2-005020**	**316 / 320**	**2.32E+01 - 2.48E+01**	**2.53E+03**	**N/A**	**1.50E+03 n**	**N/A**		**YES**	**ASL**
	7440-41-7	**BERYLLIUM**	**2.60E-02 J**	**2.43E+01**	**mg/kg**	**DU16TP2**	**DU16TP2-020040**	**239 / 320**	**3.90E-01 - 5.97E+01**	**2.43E+01**	**N/A**	**1.60E+01 n**	**N/A**		**YES**	**ASL**
	7440-43-9	**CADMIUM**	**4.90E-02 J**	**2.12E+02**	**mg/kg**	**DU18TP2**	**DU18TP2-005020**	**292 / 320**	**4.20E-01 - 5.97E+01**	**2.12E+02**	**N/A**	**7.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-70-2	CALCIUM METAL	3.86E+01 J	6.20E+04	mg/kg	DU6TP2	DU6TP2-005020	313 / 320	5.80E+02 - 6.35E+02	6.20E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	**CHROMIUM[6]**	**3.60E+00**	**1.13E+05**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**320 / 320**	**N/A**	**1.13E+05**	**N/A**	**1.20E+04 n**	**N/A**		**YES**	**ASL**
	7440-47-3	**CHROMIUM[6]**	**3.60E+00**	**1.13E+05**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**320 / 320**	**N/A**	**1.13E+05**	**N/A**	**3.00E-01 c**	**N/A**		**YES**	**ASL**
	18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**3.20E-01 J**	**1.80E+02**	**mg/kg**	**DU15TP2**	**DU15TP2-005020**	**94 / 109**	**4.30E-01 - 5.20E+01**	**1.80E+02**	**N/A**	**3.00E-01 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**1.30E-01 J**	**2.93E+04**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**228 / 320**	**3.90E+00 - 9.20E+00**	**2.93E+04**	**N/A**	**2.30E+00 n**	**N/A**		**YES**	**ASL**
	7440-50-8	**COPPER**	**2.00E+00 J**	**1.83E+05 J-**	**mg/kg**	**MP06**	**MP06-000005**	**319 / 320**	**2.90E+00 - 2.90E+00**	**1.83E+05**	**N/A**	**3.10E+02 n**	**N/A**		**YES**	**ASL**
	57-12-5	**CYANIDE**	**1.50E-01 J**	**9.20E+00**	**mg/kg**	**DU26TP1**	**DU26TP1-040080**	**62 / 320**	**5.00E-01 - 1.50E+00**	**9.20E+00**	**N/A**	**2.30E+00 n**	**N/A**		**YES**	**ASL**
	7439-89-6	**IRON**	**1.78E+03**	**1.58E+06 J-**	**mg/kg**	**MP06**	**MP06-000005**	**320 / 320**	**N/A**	**1.58E+06**	**N/A**	**5.50E+03 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**2.70E+00**	**1.21E+05**	**mg/kg**	**MP10**	**MP10-000005**	**320 / 320**	**N/A**	**1.21E+05**	**N/A**	**2.00E+02**	**N/A**		**YES**	**ASL**

Table 2.2
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7439-95-4	MAGNESIUM	1.89E+02 J	1.07E+04 J	mg/kg	MW17	MW-17-005020	308 / 320	5.51E+02 - 6.21E+02	1.07E+04	N/A	N/A	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**3.00E+00**	**2.66E+03**	**mg/kg**	**DU11TP1**	**DU11TP1-020040**	**320 / 320**	**N/A**	**2.66E+03**	**N/A**	**1.80E+02 n**	**N/A**		**YES**	**ASL**
	7439-97-6	**MERCURY**	**4.00E-03 J-**	**9.33E+01**	**mg/kg**	**DU21TP2**	**DU21TP2-005020**	**253 / 316**	**9.90E-02 - 2.00E-01**	**9.33E+01**	**N/A**	**1.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-02-0	**NICKEL**	**1.00E+00 J**	**1.82E+04**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**305 / 320**	**4.40E+00 - 5.40E+00**	**1.82E+04**	**N/A**	**1.50E+02 n**	**N/A**		**YES**	**ASL**
	7440-09-7	POTASSIUM	1.91E+01 J	5.34E+03	mg/kg	DU16TP2	DU16TP2-020040	297 / 320	4.33E+02 - 5.97E+04	5.34E+03	N/A	N/A	N/A		NO	NUT
	7782-49-2	**SELENIUM**	**3.00E-01 J**	**6.82E+01**	**mg/kg**	**DU18TP2**	**DU18TP2-005020**	**125 / 320**	**2.60E+00 - 4.18E+02**	**6.82E+01**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-22-4	**SILVER**	**5.20E-02 J**	**1.36E+02**	**mg/kg**	**DU8TP2**	**DU8TP2-005020**	**225 / 320**	**8.40E-01 - 1.19E+02**	**1.36E+02**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-23-5	SODIUM	3.37E+01 J+	6.16E+03	mg/kg	DU15TP1	DU15TP1-020040	219 / 320	4.35E+02 - 5.97E+04	6.16E+03	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**1.80E-01 J-**	**8.45E+01 J**	**mg/kg**	**DU9TP2**	**DU9TP2-020040**	**143 / 315**	**1.95E+00 - 5.90E+00**	**8.45E+01**	**N/A**	**7.80E-02 n**	**N/A**		**YES**	**ASL**
	7440-62-2	**VANADIUM (FUME OR DUST)**	**4.70E+00**	**1.82E+03**	**mg/kg**	**MP34**	**MP34-000005**	**320 / 320**	**N/A**	**1.82E+03**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-66-6	**ZINC**	**8.10E+00**	**1.27E+05 J-**	**mg/kg**	**MP06**	**MP06-000005**	**318 / 320**	**5.00E+00 - 7.50E+00**	**1.27E+05**	**N/A**	**2.30E+03 n**	**N/A**		**YES**	**ASL**
	13966-02-4	BERYLLIUM-7	2.47E-01	3.29E-01	pCi/g	RAD17	RAD17-000005	2 / 5	2.16E-01 - 2.42E-01	3.29E-01	N/A	5.39E-01 c	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**5.66E-01 J**	**1.60E+00 J**	**pCi/g**	**OD07**	**OD07-000005**	**36 / 39**	**1.22E+00 - 1.60E+00**	**1.60E+00**	**N/A**	**1.76E-02 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**5.18E-01 J**	**5.50E+02 J**	**pCi/g**	**RAD07**	**RAD07**	**42 / 42**	**N/A**	**5.50E+02**	**N/A**	**1.53E-02 c**	**N/A**		**YES**	**ASL**
	10045-97-3	**CESIUM-137**	**2.15E-02**	**2.47E-01**	**pCi/g**	**RAD20**	**RAD20-000005**	**38 / 39**	**3.25E-02 - 3.25E-02**	**2.47E-01**	**N/A**	**4.70E-02 c**	**N/A**		**YES**	**ASL**
	14255-04-0	**LEAD-210**	**5.22E-01**	**3.53E+02 J**	**pCi/g**	**RAD07**	**RAD07**	**18 / 18**	**N/A**	**3.53E+02**	**N/A**	**1.77E-01 c**	**N/A**		**YES**	**ASL**
	15092-94-1	**LEAD-212**	**3.27E-01 J**	**1.42E+00 J**	**pCi/g**	**RAD08**	**OD07-000005**	**38 / 42**	**4.67E-01 - 6.75E-01**	**1.42E+00**	**N/A**	**1.64E-02 c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**5.91E-01 J**	**5.96E+02 J**	**pCi/g**	**RAD19**	**RAD19-000005**	**42 / 42**	**N/A**	**5.96E+02**	**N/A**	**1.34E-02 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**2.36E+00**	**1.77E+01**	**pCi/g**	**OD05**	**OD05-000005**	**42 / 42**	**N/A**	**1.77E+01**	**N/A**	**1.57E-01 c**	**N/A**		**YES**	**ASL**
	PA-234M	**PROTACTINIUM-234M**	**1.63E+00 J**	**2.73E+00 J**	**pCi/g**	**RAD08**	**RAD08**	**4 / 5**	**1.65E+00 - 1.65E+00**	**2.73E+00**	**N/A**	**1.31E-02 c**	**N/A**		**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**1.16E+00 J**	**1.24E+02**	**pCi/g**	**DU18TP2**	**DU18TP2-005020**	**20 / 20**	**N/A**	**1.24E+02**	**N/A**	**1.33E-02 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**3.87E-01**	**1.44E+00**	**pCi/g**	**OD02**	**OD02-000005**	**42 / 47**	**4.05E-01 - 1.32E+00**	**1.44E+00**	**N/A**	**1.02E-02 c**	**N/A**		**YES**	**ASL**
	14913-50-9	**THALLIUM-208**	**1.11E-01 J**	**4.35E-01 J**	**pCi/g**	**OD07**	**OD07-000005**	**39 / 39**	**N/A**	**4.35E-01**	**N/A**	**6.83E-03 c**	**N/A**		**YES**	**ASL**
	15065-10-8	**THORIUM-234**	**5.88E-01 J**	**1.76E+00 J**	**pCi/g**	**OD03**	**OD03-005020**	**16 / 24**	**1.04E+00 - 1.20E+01**	**1.76E+00**	**N/A**	**1.31E-02 c**	**N/A**		**YES**	**ASL**
	15117-96-1	**URANIUM-235**	**5.97E-02 J**	**2.15E-01 J**	**pCi/g**	**RAD13**	**RAD13**	**11 / 15**	**5.45E-02 - 1.54E-01**	**2.15E-01**	**N/A**	**4.63E-02 c**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for residential soil (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1).
RSL value for xylenes used for m,p-xylene.
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene.
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 30.48 acres (200,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value

mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

[6] Due to limited hexavalent chromium speciation; chromium concentrations screened against both hexavalent and trivalent chromium residential soil RSI
[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners
[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0

Table 2.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum Soil Detection (mg/kg)	Maximum Soil Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Concentration Used for Screening [2]	Units	Screening Toxicity Value [4]	Units	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
Peck																
	87-61-6	1,2,3-TRICHLOROBENZENE	3.30E-03 J	4.20E+00	9.32E-04	1.19E+00	µg/m^3	DU21TP2	DU21TP2-040080	3 / 232	1.19E+00	µg/m^3	N/A	µg/m^3	NO	NTX
	120-82-1	**1,2,4-TRICHLOROBENZENE**	**2.40E-03 J**	**3.60E+01**	**7.30E-04**	**1.09E+01**	**µg/m^3**	**DU21TP2**	**DU21TP2-040080**	**12 / 233**	**1.09E+01**	**µg/m^3**	**8.80E-01 n**	**µg/m^3**	**YES**	**ASL**
	95-50-1	1,2-DICHLOROBENZENE	4.90E-03 J	4.40E-02 J-	3.81E-03	3.42E-02	µg/m^3	DU11TP2	DU11TP2-005020	4 / 233	3.42E-02	µg/m^3	8.80E+01 n	µg/m^3	NO	BSL
	541-73-1	1,3-DICHLOROBENZENE	3.10E-03 J	1.50E+01	7.02E-07	3.40E-03	µg/m^3	DU11TP2	DU11TP2-005020	8 / 233	3.40E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	106-46-7	**1,4-DICHLOROBENZENE**	**3.70E-03 J**	**3.50E+01**	**3.22E-03**	**3.05E+01**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**9 / 233**	**3.05E+01**	**µg/m^3**	**1.10E+00 c**	**µg/m^3**	**YES**	**ASL**
	78-93-3	2-BUTANONE	7.30E-03 J	3.10E-01 J+	5.44E-03	2.31E-01	µg/m^3	DU9TP1	DU9TP1-040080	21 / 235	2.31E-01	µg/m^3	2.20E+03 n	µg/m^3	NO	BSL
	108-10-1	4-METHYL-2-PENTANONE	1.80E-02	1.80E-02	1.55E-02	1.55E-02	µg/m^3	DU11TP2	DU11TP2-005020	1 / 235	1.55E-02	µg/m^3	1.30E+03 n	µg/m^3	NO	BSL
	67-64-1	ACETONE	5.30E-03 J	3.40E-01 J+	3.53E-03	8.74E-01	µg/m^3	DU9TP1	DU9TP1-040080	131 / 235	8.74E-01	µg/m^3	1.40E+04 n	µg/m^3	NO	BSL
	71-43-2	BENZENE	2.50E-03 J	2.60E-01	6.43E-03	6.68E-01	µg/m^3	DU11TP2	DU11TP2-005020	9 / 235	6.68E-01	µg/m^3	1.60E+00 c	µg/m^3	NO	BSL
	75-15-0	CARBON DISULFIDE	2.90E-03 J	1.10E-02 J	2.26E-02	8.57E-02	µg/m^3	HSTP12	HSTP12-040080	9 / 235	8.57E-02	µg/m^3	3.10E+02 n	µg/m^3	NO	BSL
	108-90-7	**CHLOROBENZENE**	**2.60E-03 J**	**3.40E+01**	**3.67E-03**	**4.79E+01**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**7 / 235**	**4.79E+01**	**µg/m^3**	**2.20E+01 n**	**µg/m^3**	**YES**	**ASL**
	110-82-7	CYCLOHEXANE	5.20E-03 J	6.40E-03 J+	4.53E-02	5.58E-02	µg/m^3	DU11TP2	DU11TP2-020040	2 / 235	5.58E-02	µg/m^3	2.60E+03 n	µg/m^3	NO	BSL
	100-41-4	ETHYLBENZENE	2.50E-03 J	2.30E+00	4.01E-03	3.69E+00	µg/m^3	DU11TP2	DU11TP2-005020	14 / 235	3.69E+00	µg/m^3	4.90E+00 c	µg/m^3	NO	BSL
	98-82-8	ISOPROPYLBENZENE (CUMENE)	1.45E-03 J	5.00E-02	2.12E-03	7.32E-02	µg/m^3	DU17TP2	DU17TP2-040080	10 / 235	7.32E-02	µg/m^3	1.80E+02 n	µg/m^3	NO	BSL
	179601-23-1	m,p-XYLENE	2.50E-03 J	6.80E+00	4.15E-03	1.13E+01	µg/m^3	DU11TP2	DU11TP2-005020	23 / 235	1.13E+01	µg/m^3	4.40E+01 n	µg/m^3	NO	BSL
	79-20-9	METHYL ACETATE	2.70E-03 J	2.90E-02	3.02E-03	3.25E-02	µg/m^3	MW22	MW-22-020040	3 / 235	3.25E-02	µg/m^3	N/A	µg/m^3	NO	NTX
	1634-04-4	METHYL TERT-BUTYL ETHER	2.50E-03 J	1.30E-02	4.64E-03	2.41E-02	µg/m^3	HSTP11	HSTP11-020040	6 / 235	2.41E-02	µg/m^3	4.70E+01 c	µg/m^3	NO	BSL
	108-87-2	METHYLCYLOHEXANE	2.40E-03 J	4.40E-02 J+	5.44E-07	9.97E-06	µg/m^3	DU11TP2	DU11TP2-020040	10 / 235	9.97E-06	µg/m^3	N/A	µg/m^3	NO	NTX
	75-09-2	METHYLENE CHLORIDE	2.10E-03 J	9.20E-03	8.71E-03	3.82E-02	µg/m^3	HSTP09	HSTP09-040080	69 / 235	3.82E-02	µg/m^3	2.60E+02 n	µg/m^3	NO	BSL
	95-47-6	o-XYLENE	2.50E-03 J	1.10E+00	3.52E-03	1.55E+00	µg/m^3	DU11TP2	DU11TP2-005020	20 / 235	1.55E+00	µg/m^3	4.40E+01 n	µg/m^3	NO	BSL
	100-42-5	STYRENE (MONOMER)	2.20E-02	2.20E-02	2.14E-02	2.14E-02	µg/m^3	DU11TP2	DU11TP2-005020	1 / 235	2.14E-02	µg/m^3	4.40E+02 n	µg/m^3	NO	BSL
	108-88-3	TOLUENE	2.30E-03 J	7.90E-02 J+	4.88E-03	1.68E-01	µg/m^3	DU9TP1	DU9TP1-040080	13 / 235	1.68E-01	µg/m^3	2.20E+03 n	µg/m^3	NO	BSL
	95-94-3	1,2,4,5-TETRACHLOROBENZENE	1.40E+00	1.40E+00	2.51E-01	2.51E-01	µg/m^3	DU21TP2	DU21TP2-040080	1 / 309	2.51E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	99-35-4	1,3,5-TRINITROBENZENE	2.40E+00 J	2.40E+00 J	5.44E-04	5.44E-04	µg/m^3	DU9TP1	DU9TP1-040080	1 / 60	5.44E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	123-91-1	1,4-DIOXANE	1.30E-02 J	1.30E-02 J	2.98E-03	2.98E-03	µg/m^3	DU17TP2	DU17TP2-040080	1 / 304	2.98E-03	µg/m^3	2.50E+00 c	µg/m^3	NO	BSL
	58-90-2	2,3,4,6-TETRACHLOROPHENOL	1.20E-01 J	1.80E-01 J	2.72E-05	4.08E-05	µg/m^3	HSTP05	HSTP05-005020	2 / 309	4.08E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	95-95-4	2,4,5-TRICHLOROPHENOL	2.30E-01	2.30E-01	5.21E-05	5.21E-05	µg/m^3	DU21TP2	DU21TP2-040080	1 / 309	5.21E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	120-83-2	2,4-DICHLOROPHENOL	1.50E-01 J	1.50E-01 J	3.40E-05	3.40E-05	µg/m^3	DU21TP2	DU21TP2-040080	1 / 309	3.40E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	105-67-9	2,4-DIMETHYLPHENOL	1.20E-01 J	1.30E+00	2.72E-05	2.94E-04	µg/m^3	DU22TP1	DU22TP1-005020	4 / 309	2.94E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	51-28-5	2,4-DINITROPHENOL	4.40E-02 J+	4.40E-02 J+	9.97E-06	9.97E-06	µg/m^3	MW17	MW-17-020040	1 / 297	9.97E-06	µg/m^3	N/A	µg/m^3	NO	NTX
	121-14-2	2,4-DINITROTOLUENE	5.40E-02 J	5.40E-02 J	1.22E-05	1.22E-05	µg/m^3	DU17TP2	DU17TP2-040080	1 / 312	1.22E-05	µg/m^3	1.40E-01 c	µg/m^3	NO	BSL
	606-20-2	2,6-DINITROTOLUENE	2.70E-01	3.30E-01	6.12E-05	7.47E-05	µg/m^3	MP30	MP30-000005	3 / 312	7.47E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	95-57-8	2-CHLOROPHENOL	6.90E-02 J	6.90E-02 J	4.53E-03	4.53E-03	µg/m^3	DU21TP2	DU21TP2-040080	1 / 307	4.53E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	95-48-7	2-METHLYPHENOL	4.00E-02 J	2.10E-01 J	9.06E-06	4.76E-05	µg/m^3	HSTP04	HSTP04-005020	3 / 309	4.76E-05	µg/m^3	2.60E+02 n	µg/m^3	NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	2.60E-02 J	2.70E+00	4.08E-03	4.24E-01	µg/m^3	HSTP02	HSTP02-020040	64 / 309	4.24E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	88-74-4	2-NITROANILINE	8.60E-02 J	8.60E-02 J	1.95E-05	1.95E-05	µg/m^3	DU17TP2	DU17TP2-040080	1 / 304	1.95E-05	µg/m^3	2.20E-02 n	µg/m^3	NO	BSL
	99-09-2	3-NITROANILINE	6.80E-02 J	6.80E-02 J	1.54E-05	1.54E-05	µg/m^3	DU17TP2	DU17TP2-040080	1 / 304	1.54E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	534-52-1	4,6-DINITRO-2-METHYLPHENOL	5.20E-02 J	4.30E-01 J	1.18E-05	9.74E-05	µg/m^3	DU22TP1	DU22TP1-040080	2 / 278	9.74E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	19406-51-0	4-AMINO-2,6-DINITROTOLUENE	2.30E+00 J	2.30E+00 J	5.21E-04	5.21E-04	µg/m^3	DU9TP1	DU9TP1-040080	1 / 60	5.21E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	106-47-8	4-CHLOROANILINE	1.90E-01 J	1.90E-01 J	4.30E-05	4.30E-05	µg/m^3	MP06	MP06-000005	1 / 306	4.30E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	106-44-5	4-METHLYPHENOL	3.90E-02 J	6.00E-01	8.83E-06	1.36E-04	µg/m^3	DU22TP1	DU22TP1-005020	11 / 309	1.36E-04	µg/m^3	2.60E+02 n	µg/m^3	NO	BSL
	83-32-9	ACENAPHTHENE	3.00E-02 J	4.90E+00	1.95E-03	3.18E-01	µg/m^3	HSTP02	HSTP02-020040	86 / 309	3.18E-01	µg/m^3	N/A	µg/m^3	NO	NTX

Table 2.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum Soil Detection (mg/kg)	Maximum Soil Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Concentration Used for Screening [2]	Units	Screening Toxicity Value [4]	Units	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	208-96-8	ACENAPHTHYLENE	2.40E-02 J	7.40E-01	5.44E-06	1.68E-04	µg/m^3	HSTP09	HSTP09-005020	36 / 309	1.68E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	98-86-2	ACETOPHENONE	4.20E-02 J	2.40E+00	6.40E-03	3.66E-01	µg/m^3	HSTP10	HSTP10-000005	45 / 309	3.66E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	120-12-7	ANTHRACENE	2.90E-02 J	4.80E+00	5.10E-04	8.45E-02	µg/m^3	OD04	OD04-000005	128 / 309	8.45E-02	µg/m^3	N/A	µg/m^3	NO	NTX
	100-52-7	BENZALDEHYDE	5.40E-02 J	2.90E+00	2.18E-02	1.17E+00	µg/m^3	HSTP10	HSTP10-000005	13 / 309	1.17E+00	µg/m^3	N/A	µg/m^3	NO	NTX
	56-55-3	BENZO[A]ANTHRACENE	3.10E-02 J	1.54E+01	7.09E-05	3.51E-02	µg/m^3	OD04	OD04-000005	201 / 309	3.51E-02	µg/m^3	2.00E-01 c	µg/m^3	NO	BSL
	50-32-8	**BENZO[A]PYRENE**	**4.10E-02**	**1.20E+01**	**9.29E-06**	**2.72E-03**	**µg/m^3**	**MP06**	**MP06-000005**	**196 / 309**	**2.72E-03**	**µg/m^3**	**8.80E-04 n**	**µg/m^3**	**YES**	**ASL**
	205-99-2	BENZO[B]FLUORANTHENE	4.50E-02 J	1.91E+01	1.02E-05	4.33E-03	µg/m^3	OD04	OD04-000005	208 / 309	4.33E-03	µg/m^3	2.00E-01 c	µg/m^3	NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	2.60E-02 J	1.10E+01	5.89E-06	2.49E-03	µg/m^3	MP06	MP06-000005	183 / 309	2.49E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	207-08-9	BENZO[K]FLUORANTHENE	4.10E-02 J	9.50E+00	9.29E-06	2.15E-03	µg/m^3	MP06	MP06-000005	178 / 309	2.15E-03	µg/m^3	2.00E+00 c	µg/m^3	NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	4.30E-02 J	1.40E+00	9.74E-06	3.17E-04	µg/m^3	MP31; MP32	MP31-000005; MP32-000005	77 / 309	3.17E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	92-52-4	BIPHENYL	4.40E-02 J	6.40E-01	3.53E-03	5.13E-02	µg/m^3	HSTP02	HSTP02-020040	22 / 309	5.13E-02	µg/m^3	1.80E-01 n	µg/m^3	NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	4.10E-02 J	1.80E+02	9.29E-06	4.08E-02	µg/m^3	WASD07	WASD07-000005	164 / 309	4.08E-02	µg/m^3	5.10E+00 c	µg/m^3	NO	BSL
	105-60-2	CAPROLACTAM	1.00E-01 J	6.70E+00	2.27E-05	1.52E-03	µg/m^3	DU10TP1	DU10TP1-040080	12 / 309	1.52E-03	µg/m^3	9.60E-01 n	µg/m^3	NO	BSL
	86-74-8	CARBAZOLE	4.30E-02 J	3.20E+00	9.74E-06	7.25E-04	µg/m^3	MP29	MP29-000005	74 / 309	7.25E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	218-01-9	CHRYSENE	3.80E-02 J	1.55E+01	8.61E-06	3.50E-03	µg/m^3	OD04	OD04-000005	206 / 309	3.50E-03	µg/m^3	2.00E+01 c	µg/m^3	NO	BSL
	53-70-3	DIBENZ[A,H]ANTHRACENE	2.60E-02 J	3.10E+00	5.89E-06	7.02E-04	µg/m^3	MP06	MP06-000005	96 / 309	7.02E-04	µg/m^3	2.00E-02 c	µg/m^3	NO	BSL
	132-64-9	DIBENZOFURAN	2.70E-02 J	2.50E+00	1.58E-03	1.47E-01	µg/m^3	HSTP02	HSTP02-020040	70 / 309	1.47E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	84-66-2	DIETHYL PHTHALATE	4.60E-02 J	1.40E-01 J	1.04E-05	3.17E-05	µg/m^3	DU22TP1; DU21TP2	DU22TP1-040080; DU21TP2-040080	12 / 309	3.17E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	131-11-3	DIMETHYL PHTHALATE	4.90E-02 J	2.30E+00	1.11E-05	5.21E-04	µg/m^3	DU22TP1	DU22TP1-040080	220 / 309	5.21E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	3.50E-02 J	6.20E+00	7.93E-06	1.40E-03	µg/m^3	MP49	MP49-000005	85 / 309	1.40E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	117-84-0	DI-N-OCTYL PHTHALATE	7.70E-02 J	8.20E-01	1.74E-05	1.86E-04	µg/m^3	DU17TP1	DU17TP1-005020	7 / 309	1.86E-04	µg/m^3	N/A	µg/m^3	NO	NTX
	206-44-0	FLUORANTHENE	3.80E-02 J	3.12E+01	8.61E-06	7.07E-03	µg/m^3	OD04	OD04-000005	218 / 309	7.07E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	86-73-7	FLUORENE	3.40E-02 J	4.30E+00	1.11E-03	1.40E-01	µg/m^3	HSTP02	HSTP02-020040	84 / 309	1.40E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	118-74-1	HEXACHLOROBENZENE	1.30E-01 J	1.30E-01 J	1.74E-02	1.74E-02	µg/m^3	MW17	MW-17-020040	1 / 309	1.74E-02	µg/m^3	2.70E-02 c	µg/m^3	NO	BSL
	193-39-5	INDENO[1,2,3-CD]PYRENE	4.30E-02 J	9.50E+00	9.74E-06	2.15E-03	µg/m^3	MP06	MP06-000005	178 / 309	2.15E-03	µg/m^3	2.00E-01 c	µg/m^3	NO	BSL
	91-20-3	**NAPHTHALENE**	**2.50E-02 J**	**3.80E+00**	**4.91E-03**	**7.46E-01**	**µg/m^3**	**DU14TP2**	**DU14TP2-020040**	**73 / 309**	**7.46E-01**	**µg/m^3**	**3.60E-01 c**	**µg/m^3**	**YES**	**ASL**
	86-30-6	N-NITROSODIPHENYLAMINE	4.60E-02 J	4.60E-02 J	1.04E-05	1.04E-05	µg/m^3	DU19TP1	DU19TP1-005020	1 / 309	1.04E-05	µg/m^3	4.70E+00 c	µg/m^3	NO	BSL
	85-01-8	PHENANTHRENE	3.30E-02 J	2.35E+01	7.47E-06	5.32E-03	µg/m^3	OD04	OD04-000005	194 / 309	5.32E-03	µg/m^3	N/A	µg/m^3	NO	NTX
	108-95-2	PHENOL	4.10E-02 J	2.40E+00	9.29E-06	5.44E-04	µg/m^3	HSTP04	HSTP04-005020	24 / 309	5.44E-04	µg/m^3	8.80E+01 n	µg/m^3	NO	BSL
	129-00-0	PYRENE	4.20E-02 J	2.62E+01	1.70E-04	1.06E-01	µg/m^3	OD04	OD04-000005	217 / 309	1.06E-01	µg/m^3	N/A	µg/m^3	NO	NTX
	72-54-8	4,4'-DDD	2.30E-03 J-	1.30E-01 J	5.21E-07	2.94E-05	µg/m^3	DU23TP2	DU23TP2-005020	18 / 292	2.94E-05	µg/m^3	1.80E-01 c	µg/m^3	NO	BSL
	72-55-9	4,4'-DDE	1.10E-03 J	1.80E+00 J	5.00E-06	8.19E-03	µg/m^3	MW22	MW-22-005020	27 / 292	8.19E-03	µg/m^3	1.30E-01 c	µg/m^3	NO	BSL
	50-29-3	4,4'-DDT	1.20E-03 J	1.10E+01	2.72E-07	2.49E-03	µg/m^3	MW22	MW-22-005020	26 / 291	2.49E-03	µg/m^3	1.30E-01 c	µg/m^3	NO	BSL
	309-00-2	ALDRIN	6.70E-04 J	3.10E-03 J+	3.70E-06	1.71E-05	µg/m^3	MW19	MW-19-005020	6 / 291	1.71E-05	µg/m^3	2.50E-03 c	µg/m^3	NO	BSL
	319-84-6	ALPHA-BHC	6.70E-04 J+	4.50E-03 J+	1.52E-07	1.02E-06	µg/m^3	MW22	MW-22-005020	6 / 292	1.02E-06	µg/m^3	6.80E-03 c	µg/m^3	NO	BSL
	319-85-7	BETA-BHC	6.10E-04 J	6.40E-03 J+	1.38E-07	1.45E-06	µg/m^3	MW22	MW-22-005020	16 / 292	1.45E-06	µg/m^3	2.30E-02 c	µg/m^3	NO	BSL
	12789-03-6	CHLORDANE	6.60E-04	3.43E-01	4.08E-06	2.12E-03	µg/m^3	MW19	MW-19-005020	22 / 291	2.12E-03	µg/m^3	1.20E-01	µg/m^3	NO	BSL
	319-86-8	DELTA-BHC	8.30E-04 J	7.20E-03	1.88E-07	1.63E-06	µg/m^3	DU26TP2	DU26TP2-020040	3 / 292	1.63E-06	µg/m^3	2.40E-02 c	µg/m^3	NO	BSL
	60-57-1	DIELDRIN	1.40E-03 J	1.70E+00 J	3.17E-07	3.85E-04	µg/m^3	MW22	MW-22-005020	17 / 292	3.85E-04	µg/m^3	2.70E-03 c	µg/m^3	NO	BSL
	959-98-8	ENDOSULFAN I	1.20E-03 J	4.80E-02 J+	2.72E-07	1.09E-05	µg/m^3	MW22	MW-22-005020	4 / 292	1.09E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	33213-65-9	ENDOSULFAN II	1.80E-03 J	1.30E-01 J+	4.08E-07	2.94E-05	µg/m^3	MW22	MW-22-005020	9 / 292	2.94E-05	µg/m^3	N/A	µg/m^3	NO	NTX
	1031-07-8	ENDOSULFAN SULFATE	2.70E-03 J	8.20E-02 J+	6.12E-07	1.86E-05	µg/m^3	MW22	MW-22-005020	6 / 292	1.86E-05	µg/m^3	N/A	µg/m^3	NO	NTX

Table 2.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum Soil Detection (mg/kg)		Maximum Soil Detection (mg/kg)		Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Concentration Used for Screening [2]	Units	Screening Toxicity Value [4]		Units	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	72-20-8	ENDRIN	1.10E-03	J	8.40E-01	J	2.49E-07	1.90E-04	µg/m^3	MW22	MW-22-005020	15 / 292	1.90E-04	µg/m^3	N/A		µg/m^3	NO	NTX
	7421-93-4	ENDRIN ALDEHYDE	1.90E-03	J	1.70E+00	J	4.30E-07	3.85E-04	µg/m^3	MW22	MW-22-005020	19 / 292	3.85E-04	µg/m^3	N/A		µg/m^3	NO	NTX
	53494-70-5	ENDRIN KETONE	1.20E-03	J	3.70E-02	J+	2.72E-07	8.38E-06	µg/m^3	MW22	MW-22-005020	10 / 292	8.38E-06	µg/m^3	N/A		µg/m^3	NO	NTX
	58-89-9	GAMMA-BHC (LINDANE)	7.40E-04	J	1.50E-02	J	1.68E-07	3.40E-06	µg/m^3	MW19	MW-19-040080	9 / 292	3.40E-06	µg/m^3	4.00E-02	c	µg/m^3	NO	BSL
	76-44-8	HEPTACHLOR	5.10E-04	J	8.50E-03	J+	9.79E-06	1.63E-04	µg/m^3	MW19; MW22	MW-19-005020; MW-22-005020	12 / 292	1.63E-04	µg/m^3	9.40E-03	c	µg/m^3	NO	BSL
	1024-57-3	HEPTACHLOR EPOXIDE	6.10E-04	J	3.90E-01	J	6.72E-06	4.29E-03	µg/m^3	MW22	MW-22-005020	17 / 292	4.29E-03	µg/m^3	4.70E-03	c	µg/m^3	NO	BSL
	72-43-5	METHOXYCHLOR	4.30E-03	J	1.70E-01	J+	9.74E-07	3.85E-05	µg/m^3	MW22	MW-22-005020	6 / 292	3.85E-05	µg/m^3	N/A		µg/m^3	NO	NTX
	12672-29-6	**AROCLOR-1248**	**6.20E-02**	**J**	**4.30E+03**	**J**	**9.15E-04**	**6.35E+01**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**83 / 321**	**6.35E+01**	**µg/m^3**	**2.10E-02**	**c**	**µg/m^3**	**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**1.30E-02**	**J**	**2.10E+03**		**1.43E-04**	**2.31E+01**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**140 / 321**	**2.31E+01**	**µg/m^3**	**2.10E-02**	**c**	**µg/m^3**	**YES**	**ASL**
	11096-82-5	**AROCLOR-1260**	**5.10E-03**	**J**	**8.60E+02**		**3.64E-05**	**6.14E+00**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**184 / 321**	**6.14E+00**	**µg/m^3**	**2.10E-02**	**c**	**µg/m^3**	**YES**	**ASL**
	11100-14-4	AROCLOR-1268	3.80E-02	J+	8.40E-02	J+	8.61E-06	1.90E-05	µg/m^3	MW23	MW-23-020040	2 / 321	1.90E-05	µg/m^3	**2.10E-02**	**c**	µg/m^3	NO	BSL
	NA	**TEQ for PCB Congeners [7] [10]**	**4.97E-09**		**1.64E-03**		**2.42E-11**	**7.96E-06**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**26 / 26**	**7.96E-06**	**µg/m^3**	**3.20E-07**	**c**	**µg/m^3**	**YES**	**ASL**
	NA	**High Risk PCBs [8]**	**3.06E-03**		**1.39E+03**		**5.29E-05**	**2.42E+01**	**µg/m^3**	**DU11TP2**	**DU11TP2-005020**	**26 / 26**	**2.42E+01**	**µg/m^3**	**2.10E-02**	**c**	**µg/m^3**	**YES**	**ASL**
	NA	**2,3,7,8-TCDD TEQ [9] [10]**	**1.43E-06**		**1.20E-03**		**6.95E-09**	**5.84E-06**	**µg/m^3**	**MW22**	**MW-22-005020**	**45 / 45**	**5.84E-06**	**µg/m^3**	**3.20E-07**	**c**	**µg/m^3**	**YES**	**ASL**
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**6.33E+02**		**1.24E+06**	**J-**	**1.43E-01**	**2.81E+02**	**µg/m^3**	**MP06**	**MP06-000005**	**320 / 320**	**2.81E+02**	**µg/m^3**	**2.20E+00**	**n**	**µg/m^3**	**YES**	**ASL**
	7440-36-0	ANTIMONY	2.30E-01	J	1.85E+03		5.21E-05	4.19E-01	µg/m^3	MP10	MP10-000005	187 / 320	4.19E-01	µg/m^3	N/A		µg/m^3	NO	NTX
	7440-38-2	**ARSENIC**	**5.30E-01**	**J**	**1.61E+02**	**J**	**1.20E-04**	**3.65E-02**	**µg/m^3**	**DU9TP2**	**DU9TP2-020040**	**316 / 320**	**3.65E-02**	**µg/m^3**	**2.90E-03**	**c**	**µg/m^3**	**YES**	**ASL**
	7440-39-3	**BARIUM**	**8.60E+00**	**J**	**2.53E+03**		**1.95E-03**	**5.72E-01**	**µg/m^3**	**DU22TP2**	**DU22TP2-005020**	**316 / 320**	**5.72E-01**	**µg/m^3**	**2.20E-01**	**n**	**µg/m^3**	**YES**	**ASL**
	7440-41-7	**BERYLLIUM**	**2.60E-02**	**J**	**2.43E+01**		**5.89E-06**	**5.50E-03**	**µg/m^3**	**DU16TP2**	**DU16TP2-020040**	**239 / 320**	**5.50E-03**	**µg/m^3**	**5.10E-03**	**c**	**µg/m^3**	**YES**	**ASL**
	7440-43-9	**CADMIUM**	**4.90E-02**	**J**	**2.12E+02**		**1.11E-05**	**4.80E-02**	**µg/m^3**	**DU18TP2**	**DU18TP2-005020**	**292 / 320**	**4.80E-02**	**µg/m^3**	**4.40E-03**	**n**	**µg/m^3**	**YES**	**ASL**
	7440-70-2	CALCIUM METAL	3.86E+01	J	6.20E+04		8.74E-03	1.40E+01	µg/m^3	DU6TP2	DU6TP2-005020	313 / 320	1.40E+01	µg/m^3	N/A		µg/m^3	NO	NUT
	7440-47-3	CHROMIUM[6]	3.60E+00		1.13E+05		8.15E-04	2.56E+01	µg/m^3	DU9TP2	DU9TP2-020040	320 / 320	2.56E+01	µg/m^3	N/A		µg/m^3	NO	NTX
	7440-47-3	**CHROMIUM[6]**	**3.60E+00**		**1.13E+05**		**8.15E-04**	**2.56E+01**	**µg/m^3**	**DU9TP2**	**DU9TP2-020040**	**320 / 320**	**2.56E+01**	**µg/m^3**	**1.50E-04**		**µg/m^3**	**YES**	**ASL**
	18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**3.20E-01**	**J**	**1.80E+02**		**7.25E-05**	**4.08E-02**	**µg/m^3**	**DU15TP2**	**DU15TP2-005020**	**94 / 109**	**4.08E-02**	**µg/m^3**	**1.50E-04**		**µg/m^3**	**YES**	**ASL**
	7440-48-4	**COBALT**	**1.30E-01**	**J**	**2.93E+04**		**2.94E-05**	**6.64E+00**	**µg/m^3**	**DU9TP2**	**DU9TP2-020040**	**228 / 320**	**6.64E+00**	**µg/m^3**	**1.40E-03**		**µg/m^3**	**YES**	**ASL**
	7440-50-8	COPPER	2.00E+00	J	1.83E+05	J-	4.53E-04	4.15E+01	µg/m^3	MP06	MP06-000005	319 / 320	4.15E+01	µg/m^3	N/A		µg/m^3	NO	NTX
	57-12-5	CYANIDE	1.50E-01	J	9.20E+00		3.40E-05	2.08E-03	µg/m^3	DU26TP1	DU26TP1-040080	62 / 320	2.08E-03	µg/m^3	3.50E-01	n	µg/m^3	NO	BSL
	7439-89-6	IRON	1.78E+03		1.58E+06	J-	4.03E-01	3.58E+02	µg/m^3	MP06	MP06-000005	320 / 320	3.58E+02	µg/m^3	N/A		µg/m^3	NO	NTX
	7439-92-1	LEAD	2.70E+00		1.21E+05		6.12E-04	2.74E+01	µg/m^3	MP10	MP10-000005	320 / 320	2.74E+01	µg/m^3	N/A		µg/m^3	NO	NTX
	7439-95-4	MAGNESIUM	1.89E+02	J	1.07E+04	J	4.28E-02	2.42E+00	µg/m^3	MW17	MW-17-005020	308 / 320	2.42E+00	µg/m^3	N/A		µg/m^3	NO	NUT
	7439-96-5	**MANGANESE**	**3.00E+00**		**2.66E+03**		**6.80E-04**	**6.02E-01**	**µg/m^3**	**DU11TP1**	**DU11TP1-020040**	**320 / 320**	**6.02E-01**	**µg/m^3**	**2.20E-02**	**n**	**µg/m^3**	**YES**	**ASL**
	7439-97-6	MERCURY	4.00E-03	J-	9.33E+01		7.02E-03	2.11E-03	µg/m^3	DU21TP2	DU21TP2-005020	253 / 316	2.11E-03	µg/m^3	1.30E-01	n	µg/m^3	NO	BSL
	7440-02-0	**NICKEL**	**1.00E+00**	**J**	**1.82E+04**		**2.27E-04**	**4.12E+00**	**µg/m^3**	**DU9TP2**	**DU9TP2-020040**	**305 / 320**	**4.12E+00**	**µg/m^3**	**3.90E-02**	**n**	**µg/m^3**	**YES**	**ASL**
	7440-09-7	POTASSIUM	1.91E+01	J	5.34E+03		4.33E-03	1.21E+00	µg/m^3	DU16TP2	DU16TP2-020040	297 / 320	1.21E+00	µg/m^3	N/A		µg/m^3	NO	NUT
	7782-49-2	SELENIUM	3.00E-01	J	6.82E+01		6.80E-05	1.54E-02	µg/m^3	DU18TP2	DU18TP2-005020	125 / 320	1.54E-02	µg/m^3	8.80E+00	n	µg/m^3	NO	BSL
	7440-22-4	SILVER	5.20E-02	J	1.36E+02		1.18E-05	3.08E-02	µg/m^3	DU8TP2	DU8TP2-005020	225 / 320	3.08E-02	µg/m^3	N/A		µg/m^3	NO	NTX
	7440-23-5	SODIUM	3.37E+01	J+	6.16E+03		7.63E-03	1.40E+00	µg/m^3	DU15TP1	DU15TP1-020040	219 / 320	1.40E+00	µg/m^3	N/A		µg/m^3	NO	NUT
	7440-28-0	THALLIUM	1.80E-01	J-	8.45E+01	J	4.08E-05	1.91E-02	µg/m^3	DU9TP2	DU9TP2-020040	143 / 315	1.91E-02	µg/m^3	N/A		µg/m^3	NO	NTX
	7440-62-2	**VANADIUM (FUME OR DUST)**	**4.70E+00**		**1.82E+03**		**1.06E-03**	**4.12E-01**	**µg/m^3**	**MP34**	**MP34-000005**	**320 / 320**	**4.12E-01**	**µg/m^3**	**4.40E-02**	**n**	**µg/m^3**	**YES**	**ASL**
	7440-66-6	ZINC	8.10E+00		1.27E+05	J-	1.83E-03	2.88E+01	µg/m^3	MP06	MP06-000005	318 / 320	2.88E+01	µg/m^3	N/A		µg/m^3	NO	NTX
	13966-02-4	BERYLLIUM-7	2.47E-01		3.29E-01		5.59E-05	7.45E-05	pCi/m^3	RAD17	RAD17-000005	2 / 5	7.45E-05	pCi/m^3	2.51E+01	c	pCi/m^3	NO	BSL
	14913-49-6	BISMUTH-212	5.66E-01	J	1.60E+00	J	1.28E-04	3.62E-04	pCi/m^3	OD07	OD07-000005	36 / 39	3.62E-04	pCi/m^3	5.45E-02	c	pCi/m^3	NO	BSL

Table 2.3
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum Soil Detection (mg/kg)	Maximum Soil Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Concentration Used for Screening [2]	Units	Screening Toxicity Value [4]	Units	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	14733-03-0	**BISMUTH-214**	**5.18E-01 J**	**5.50E+02 J**	**1.17E-04**	**1.25E-01**	**pCi/m^3**	**RAD07**	**RAD07**	**42 / 42**	**1.25E-01**	**pCi/m^3**	**2.01E-04 c**	**pCi/m^3**	**YES**	**ASL**
	10045-97-3	CESIUM-137	2.15E-02	2.47E-01	4.87E-06	5.59E-05	pCi/m^3	RAD20	RAD20-000005	38 / 39	5.59E-05	pCi/m^3	5.50E-02 c	pCi/m^3	NO	BSL
	14255-04-0	**LEAD-210**	**5.22E-01**	**3.53E+02 J**	**1.18E-04**	**8.00E-02**	**pCi/m^3**	**RAD07**	**RAD07**	**18 / 18**	**8.00E-02**	**pCi/m^3**	**2.01E-04 c**	**pCi/m^3**	**YES**	**ASL**
	15092-94-1	LEAD-212	3.27E-01 J	1.42E+00 J	7.41E-05	3.22E-04	pCi/m^3	RAD08	RAD08	38 / 42	3.22E-04	pCi/m^3	8.63E-03 c	pCi/m^3	NO	BSL
	15067-28-4	**LEAD-214**	**5.91E-01 J**	**5.96E+02 J**	**1.34E-04**	**1.35E-01**	**pCi/m^3**	**RAD19**	**RAD19-000005**	**42 / 42**	**1.35E-01**	**pCi/m^3**	**2.01E-04 c**	**pCi/m^3**	**YES**	**ASL**
	13966-00-2	POTASSIUM-40	2.36E+00	1.77E+01	5.35E-04	4.01E-03	pCi/m^3	OD05	OD05-000005	42 / 42	4.01E-03	pCi/m^3	2.80E-02 c	pCi/m^3	NO	BSL
	PA-234M	**PROTACTINIUM-234M**	**1.63E+00 J**	**2.73E+00 J**	**3.69E-04**	**6.18E-04**	**pCi/m^3**	**RAD08**	**RAD08**	**4 / 5**	**6.18E-04**	**pCi/m^3**	**5.13E-05 c**	**pCi/m^3**	**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**1.16E+00 J**	**1.24E+02**	**2.63E-04**	**2.81E-02**	**pCi/m^3**	**DU18TP2**	**DU18TP2-005020**	**20 / 20**	**2.81E-02**	**pCi/m^3**	**1.05E-04 c**	**pCi/m^3**	**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**3.87E-01**	**1.44E+00**	**8.77E-05**	**3.26E-04**	**pCi/m^3**	**RAD08**	**RAD08**	**42 / 47**	**3.26E-04**	**pCi/m^3**	**3.30E-05 c**	**pCi/m^3**	**YES**	**ASL**
	14913-50-9	THALLIUM-208	1.11E-01 J	4.35E-01 J	2.51E-05	9.85E-05	pCi/m^3	OD07	OD07-000005	39 / 39	9.85E-05	pCi/m^3	2.53E+00 c	pCi/m^3	NO	BSL
	15065-10-8	**THORIUM-234**	**5.88E-01 J**	**1.76E+00 J**	**1.33E-04**	**3.99E-04**	**pCi/m^3**	**OD03**	**OD03-005020**	**16 / 24**	**3.99E-04**	**pCi/m^3**	**5.13E-05 c**	**pCi/m^3**	**YES**	**ASL**
	15117-96-1	**URANIUM-235**	**5.97E-02 J**	**2.15E-01 J**	**1.35E-05**	**4.86E-05**	**pCi/m^3**	**RAD13**	**RAD13**	**11 / 15**	**4.86E-05**	**pCi/m^3**	**1.98E-05 c**	**pCi/m^3**	**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for industrial air (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for xylenes used for m,p-xylene.
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene
RSL value for Aroclor-1260 used for Aroclor-1268
[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
Deletion Reason:	Below Screening Level (BSL)
	No Screening Value (NTX)
	Essential Nutrient (NUT)

[6] Due to limited hexavalent chromium speciation; chromium concentrations screened against both hexavalent and trivalent chromium residential air RSL
[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[10] Air concentration calculated using the VF for 2,3,7,8-TCDD.

Air concentration = soil concentration x (1/PEF + 1/VF)
PEF = particulate emission factor; VF = volatilization factor
PEF for construction worker = 4.4 x 10^6 m^3/kg (Calculated using equations 5-5 and 5-6 from EPA, 2002, see Table 2.3a).
VF calculated in Table 2.3b using equations from EPA, 2002.
PEF and VF calculations based on assume construction area of 26 acres.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
µg/m^3 = micrograms per cubic meter
N/A = Not available
pCi/m^3 = picocuries per cubic meter

Table 2.3a
CALCULATION OF CONSTRUCTION WORKER EXPOSURE SCENARIO PEF

Construction Scenario PEF (m^3/kg) (Lowest of Excavation Activities and Wind PEF and Contribution from Traffic on Unpaved Road PEF) =	4.41E+06

Traffic on Unpaved Road PEF

$$PEF_{SC} = {}^{Q}\!/_{C_{Sr}} \times \frac{1}{F_D} \frac{T \times A_R}{556 \times \left({}^{W}\!/_{3}\right)^{0.4} \times \left(\frac{365\ d/yr - p}{365\ d/yr}\right) \times \sum VKT}$$

Equation 5-5 from EPA, 2002

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

Equation 5-6 from EPA, 2002

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^{\,2}}$$

Equation E-16 from Appendix E of EPA, 2002

Variable	Value	Units	Definition	Source
A	12.9	unitless	Constant	Default
B	5.74	unitless	Constant	Default
C	71.8	unitless	Constant	Default
T	31,500,000	seconds	Total time over which construction occurs	Assumed
AR	2,142	m2	Surface area of contaminated road segment	Calculated, site-specific (square root of site surface contamination configured as a square x default width of road segment of 20 ft)
s	8.50	%	Road surface silt content	Default
W	11	tons	Mean weight of vehicle	Assumed (5 x 2-ton and 5 x 20-ton trucks per day)
Mdry	0.2	%	Road surface material moisture content under dry, uncontrolled conditions	Default
p	120	days	Number of days with at least 0.01 inches of precipitation	Lookup value (Exhibit 5-2 from EPA, 2002)
# days/truck	260	days		Assumed (5 days per week for 52 weeks)
SVKT	1,827	km	Sum of fleet vehicle kilometers traveled during the exposure duration	Assumed (3 vehicles x 0.045 km/day x 250 days)
LR	1,152	feet	Road length	Assumed (square root of the area)
WR	20	feet	Road width	Assumed
As	30.5	acres	Areal extent of site (or site contamination)	Site-specific
tc	8,760	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.186	unitless	Dispersion correction factor	Calculated (Equation E-16 from Appendix E of EPA, 2002)
Q/Csr	13.9	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	Calculated (Equation 5-6 from EPA, 2002)
PEF	4.41E+06	m3/kg	Subchronic road particular emission factor	Calculated

Table 2.3a

CALCULATION OF CONSTRUCTION WORKER EXPOSURE SCENARIO PEF

Excavation Activities and Wind PEF

Site Assumptions

Variable	Value	Units	Source
Site Area	30.48	acres	Site-specific
Site Area	1,327,709	square feet	Calculated, site-specific
Site Area	123,411	square meters	Calculated, site-specific
Site length	1,152	feet, assumed to be a square	Calculated, site-specific
# passes	145	# passes to cover entire site	Calculated, site-specific

Wind Erosion (Equation E-20 from Appendix E of EPA, 2002)

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760\ hr/yr$$

Variable	Value	Units	Definition	Source
V	0	unitless	Fraction of vegetative cover	Default
Um	4.69	m/s	Mean annual windspeed	Default
Ut	11.3	m/s	Equivalent threshold value of windspeed at 7m	Default
F(x)	0.194	unitless	Fuction dependent on Um/Ut derived	Default
Asurf	123,411	m2	Areal extent of site with undisturbed surface soil contamination	Site-specific, calculated
ED	1	year	Exposure duration	Assumed
Mwind	536,961	g	Unit mass emitted from wind erosion	Calculated

Excavation Emissions (Equation E-21 from Appendix E of EPA, 2002)

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times A_{excav} \times d_{excav} \times N_A \times 10^3\ g/kg$$

Variable	Value	Units	Definition	Source
Um	4.69	m/s	Mean windspeed during construction	Default
M	12	%	Gravimetric soil moisture content	Default
Psoil	1.68	Mg/m3	In-situ soil density	Default
Aexcav	61705.68114	m2	Areal extent of excavation	Assumed (one-half the site is graded)
dexcav	3.03030303	m	Average depth of excavation	Assumed (10-foot excavation)
NA	2	unitless	Number of times soil is dumped	Default
Mexcav	76612.91292	g	Unit mass emitted from excavation	Calculated

Table 2.3a
CALCULATION OF CONSTRUCTION WORKER EXPOSURE SCENARIO PEF

Dozing Emissions (Equation E-22 from Appendix E of EPA, 2002)

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
s	6.9	%	Soil silt content	Default
M	7.9	%	Gravimetric soil moisture content	Default
SVKT	101.88	km	Sum of dozing kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
S	11.4	kph	Average dozing speed	Default
Mdoz	3027.19366	g	Unit mass emitted from dozing operations	Calculated

Grading Emissions (Equation E-23 from Appendix E of EPA, 2002)

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
S	11.4	kph	Average grading speed	Default
SVKT	101.88	km	Sum of grading kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
Mgrade	44486.12227	g	Unit mass emitted from grading operations	Calculated

Tilling Emissions (Equation E-24 from Appendix E of EPA, 2002)

$$M_{till} = 1.1(s)^{0.6} \times A_{till} \times 4{,}047 m^2/acre \times 10^{-4} ha/m^2 \times 10^3 g/kg \times N_A$$

Variable	Value	Units	Definition	Source
s	18	%	Soil silt content	Default
Atill	15.24	acre	Areal extent of tilling	Calculated (assume one-half the site is tilled for re-vegetation)
NA	2	unitless	Number of times soil is tilled	Default
Mtill	76860.70351	g	Unit mass emitted from tilling or similar operations	Calculated

Table 2.3a

CALCULATION OF CONSTRUCTION WORKER EXPOSURE SCENARIO PEF

<J'T> - unit emission flux (Equation E-25 from Appendix E of EPA, 2002)

$$\langle J_T^{\cdot\cdot} \rangle = \frac{M_{wind} \times M_{excav} \times M_{doz} \times M_{grade} \times M_{till}}{A_c \times T}$$

Variable	Value	Units	Definition	Source
Ac	123411.3623	m2	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
T	31500000	s	Duration of construction	Assumed
<J'T>	1.89828E-07	g/m2-s	Total time-averaged unit emission flux for construction activities other than traffic on unpaved road	

PEF'sc (Equation E-26 from Appendix E of EPA, 2002)

$$PEF_{sc}^{\cdot\cdot} = Q/C_{sa} \times \frac{1}{F_D} \times \frac{1}{\langle J_T^{\cdot\cdot} \rangle}$$

Variable	Value	Units	Definition	Source
Ac	30.48	acres	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
Q/Csa	7.075351607	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration and the emission flux at the center of the square emission source	Calculated (equation E-15 from Appendix E of EPA, 2002)
tc	8750	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.185811726	unitless	Dispersion correction factor	Calculated (equation E-16 from Appendix E of EPA, 2002)
PEF'sc	2.01E+08	m3/kg	Subchronic particulate emission factor for construction activities other than traffic on unpaved roads	

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

Table 2.3b
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Calculation of Chemical Specific VF Factors - Excavation Scenario

		Diffusivity	Henry's Law	Diffusivity	Soil Organic Carbon	Soil Water	Solubility	Apparent	Volatilization
		in Air	Constant	in Water	Partition Coeff.	Partition Coeff.	in Water	Diffusivity	Factor
Chemical		(Di)	(H')	(Dw)	(Koc)	(Kd = Koc x Foc)	(S)	(DA)	(VF)
		(cm2/s)	(unitless)	(cm2/s)	(cm3/g)	(g/cm3)	(mg/L)	(cm2/s)	(m3/kg)
Volatile Organics									
1,2,3-Trichlorobenzene	87-61-6	3.95E-02	5.11E-02	8.38E-06	1.38E+03	8.30E+00	1.80E+01	1.28E-05	3.54E+03
1,2,4-Trichlorobenzene	120-82-1	3.96E-02	5.81E-02	8.40E-06	1.36E+03	8.14E+00	4.90E+01	1.49E-05	3.29E+03
1,2-Dichlorobenzene	95-50-1	5.62E-02	7.85E-02	8.92E-06	3.83E+02	2.30E+00	1.56E+02	9.74E-05	1.29E+03
1,4-Dichlorobenzene	106-46-7	5.50E-02	9.85E-02	8.68E-06	3.75E+02	2.25E+00	8.13E+01	1.22E-04	1.15E+03
2-Butanone (Methyl ethyl ketone)	78-93-3	9.14E-02	2.33E-03	1.02E-05	4.51E+00	2.71E-02	2.23E+05	8.94E-05	1.34E+03
4-Methyl-2-Pentanone	108-10-1	6.98E-02	5.64E-03	8.35E-06	1.26E+01	7.56E-02	1.90E+04	1.19E-04	1.16E+03
Acetone	67-64-1	1.06E-01	1.43E-03	1.15E-05	2.36E+00	1.42E-02	1.00E+06	7.1E-05	1.5E+03
Benzene	71-43-2	8.95E-02	2.27E-01	1.03E-05	1.46E+02	8.75E-01	1.79E+03	1.1E-03	3.9E+02
Carbon Disulfide	75-15-0	1.06E-01	5.89E-01	1.30E-05	2.17E+01	1.30E-01	2.16E+03	9.8E-03	1.3E+02
Chlorobenzene	108-90-7	7.21E-02	1.27E-01	9.48E-06	2.34E+02	1.40E+00	4.98E+02	3.2E-04	7.1E+02
Cyclohexane	110-82-7	8.00E-02	6.13E+00	9.11E-06	1.46E+02	8.75E-01	5.50E+01	1.2E-02	1.1E+02
Ethylbenzene	100-41-4	6.85E-02	3.22E-01	8.46E-06	4.46E+02	2.68E+00	1.69E+02	4.1E-04	6.2E+02
Isopropylbenzene (Cumene)	98-82-8	6.03E-02	4.70E-01	7.86E-06	6.98E+02	4.19E+00	6.13E+01	3.5E-04	6.8E+02
m,p-Xylenes	108-38-3	6.8E-02	2.9E-01	8.4E-06	3.8E+02	2.25E+00	1.6E+02	4.4E-04	6.0E+02
Methyl acetate	79-20-9	9.58E-02	4.70E-03	1.10E-05	3.06E+00	1.84E-02	2.43E+05	2.0E-04	8.9E+02
Methyl tert butyl ether	1634-04-4	7.53E-02	2.40E-02	8.59E-06	1.16E+01	6.94E-02	5.10E+04	5.5E-04	5.4E+02
Methylene chloride	75-09-2	1.0E-01	1.3E-01	1.3E-05	2.2E+01	1.30E-01	1.3E+04	2.8E-03	2.4E+02
o-Xylenes	95-47-6	6.89E-02	2.12E-01	8.53E-06	3.83E+02	2.30E+00	1.78E+02	3.2E-04	7.1E+02
Styrene (Monomer)	100-42-5	7.11E-02	1.12E-01	8.78E-06	4.46E+02	2.68E+00	3.10E+02	1.5E-04	1.0E+03
Toluene	108-88-3	7.78E-02	2.71E-01	9.20E-06	2.34E+02	1.40E+00	5.26E+02	7.2E-04	4.7E+02
1,2,4,5-Tetrachlorobenzene	95-94-3	3.19E-02	4.09E-02	8.75E-06	2.22E+03	1.33E+01	5.95E-01	5.2E-06	5.6E+03
1,4-Dioxane	123-91-1	8.74E-02	1.96E-04	1.05E-05	2.63E+00	1.58E-02	1.00E+06	8.5E-06	4.4E+03
2-Chlorophenol	95-57-8	6.61E-02	4.58E-04	9.48E-06	3.88E+02	2.33E+00	1.13E+04	6.9E-07	1.5E+04
2-Methylnaphthalene	91-57-6	5.2E-02	2.1E-02	7.8E-06	2.5E+03	1.49E+01	2.5E+01	4.0E-06	6.4E+03
Acenaphthene	83-32-9	5.1E-02	7.5E-03	8.3E-06	5.0E+03	3.02E+01	3.9E+00	6.7E-07	1.5E+04
Acetophenone	98-86-2	6.5E-02	4.3E-04	8.7E-06	5.2E+01	3.11E-01	6.1E+03	3.7E-06	6.6E+03
Anthracene	120-12-7	3.9E-02	2.3E-03	7.9E-06	1.6E+04	9.82E+01	4.3E-02	4.9E-08	5.8E+04
Benzaldehyde	100-52-7	7.4E-02	1.1E-03	9.5E-06	1.1E+01	6.65E-02	7.0E+03	2.6E-05	2.5E+03
Benzo(a)anthracene	56-55-3	2.61E-02	4.91E-04	6.75E-06	1.77E+05	1.06E+03	9.40E-03	6.8E-10	4.9E+05
Biphenyl	92-52-4	4.70E-02	1.26E-02	7.60E-06	5.10E+03	3.06E+01	4.00E+00	1.0E-06	1.3E+04
Dibenzofuran	132-64-9	6.51E-02	8.71E-03	7.38E-06	9.16E+03	5.50E+01	3.10E+00	5.5E-07	1.7E+04
Fluorene	86-73-7	4.4E-02	3.9E-03	7.9E-06	9.2E+03	5.50E+01	1.7E+00	1.7E-07	3.1E+04
Hexachlorobenzene	118-74-1	2.9E-02	7.0E-02	7.8E-06	6.2E+03	3.72E+01	6.2E-03	2.9E-06	7.5E+03
Naphthalene	91-20-3	6.0E-02	1.8E-02	8.4E-06	1.5E+03	9.26E+00	3.1E+01	6.2E-06	5.1E+03
Pyrene	129-00-0	2.8E-02	4.9E-04	7.2E-06	5.4E+04	3.26E+02	1.4E-01	2.3E-09	2.6E+05
4,4'-DDE	72-55-9	2.3E-02	1.7E-03	5.9E-06	1.2E+05	7.05E+02	4.0E-02	3.0E-09	2.3E+05
Aldrin	309-00-2	2.3E-02	1.8E-03	5.8E-06	8.2E+04	4.92E+02	1.7E-02	4.5E-09	1.9E+05
Chlordane	12789-03-6	2.1E-02	2.0E-03	5.4E-06	6.8E+04	4.05E+02	5.6E-02	5.7E-09	1.7E+05
Heptachlor	76-44-8	2.2E-02	1.2E-02	5.7E-06	4.1E+04	2.48E+02	1.8E-01	5.8E-08	5.3E+04
Heptachlor epoxide	1024-57-3	2.40E-02	8.59E-04	6.25E-06	1.01E+04	6.07E+01	2.00E-01	1.9E-08	9.3E+04
Aroclor-1248	12672-29-6	1.63E-02	1.80E-02	3.94E-06	7.65E+04	4.59E+02	1.00E-01	3.4E-08	6.9E+04
Aroclor-1254	11097-69-1	2.37E-02	1.16E-02	6.10E-06	1.31E+05	7.83E+02	4.30E-02	1.9E-08	9.3E+04
Aroclor-1260	11096-82-5	2.20E-02	1.37E-02	5.61E-06	3.50E+05	2.10E+03	1.44E-02	7.7E-09	1.4E+05
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	4.24E-02	2.07E-03	5.69E-06	3.50E+05	2.10E+03	7.53E-04	2.3E-09	2.7E+05
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	4.67E-02	1.16E-02	6.06E-06	1.31E+05	7.83E+02	3.40E-03	3.7E-08	6.6E+04
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	4.44E-02	2.80E-03	5.86E-06	2.09E+05	1.26E+03	2.23E-03	5.3E-09	1.7E+05
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	4.67E-02	3.78E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	1.2E-08	1.2E+05
2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	4.67E-02	7.77E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	2.5E-08	8.1E+04
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	4.67E-02	1.18E-02	6.06E-06	1.28E+05	7.67E+02	1.34E-02	3.8E-08	6.5E+04
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	4.67E-02	7.77E-03	6.06E-06	1.28E+05	7.67E+02	7.33E-03	2.5E-08	8.0E+04
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	4.94E-02	9.12E-03	6.27E-06	7.81E+04	4.69E+02	3.22E-02	5.1E-08	5.6E+04
2,3,7,8-TCDD	1746-01-6	4.70E-02	2.04E-03	6.76E-06	2.49E+05	1.49E+03	2.00E-04	3.5E-09	2.2E+05
Polychlorinated Biphenyls (high risk)	NA	2.43E-02	1.70E-02	6.27E-06	7.81E+04	4.69E+02	7.00E-01	4.7E-08	5.9E+04
Mercury	7439-97-6	3.10E-02	3.50E-01	6.30E-06	NA	1.00E+00	6.00E-02	5.0E-04	5.7E+02

Table 2.3b
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
Calculation of Chemical Specific VF Factors - Excavation Scenario

Volatilization factor (VF) (m^3/kg)
Equation 5-14 of EPA, 2002

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4} m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Apparent Diffusivity (DA) (cm^2/s)
Equation 5-14 of EPA, 2002

$$D_A = \frac{[(\theta_a^{10/3} D_i H \times \theta_w^{10/3} D_w)/n^2]}{\rho_b K_d \times \theta_w \times \theta_a H''}$$

Variable	Value	Unit	Definition	Source
Q/C =	38.2	g/m^2-s per kg/m^3	Q/Csa * (1/Fd)	Intermediate calculation
Fd	0.185	unitless	Dispersion correction factor	Default
Qa	0.28	Lair/Lwater	Air-filled soil porosity	n - Qw (Equation 5-14 of EPA, 2002)
n	0.43	Lpore/Lsoil	Total soil porosity	1 - (rb/rs) (Equation 5-14 of EPA, 2002)
Qw	0.15	Lwater/Lsoil	Water-filled soil porosity	Default
rs	2.65	g/cm^3	Soil particle density	Default
rb	1.5	g/cm^3	Dry soil bulk density	Default
T	3.154E+07	seconds	Total time over which construction occurs	Calculated (1-year duration)
foc	0.006	g/g	Fraction organic carbon in soil	Default
A	2.45	unitless	Constant	Default
Ac	30.5	acres	Areal extent of soil contamination	Site-specific
B	17.6	unitless	Constant	Default
C	189	unitless	Constant	Default
Q/Csa	7.08	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the volatilzation flux at the center of a square site	Calculated (Equation 5-15 of EPA, 2002)

Chemical and physical properties from parameter table for Regional Screening Levels, June 2017.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.

Table 2.4
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Freshwater Wetlands																
	56-55-3	BENZO[A]ANTHRACENE	1.60E-01 J	1.60E-01 J	mg/kg	WASD11	WASD11-000005	1 / 8	2.10E-01 - 3.50E-01	1.60E-01	N/A	1.10E+01 c	N/A		NO	BSL
	50-32-8	BENZO[A]PYRENE	1.40E-01 J	1.40E-01 J	mg/kg	WASD11	WASD11-000005	1 / 8	2.10E-01 - 3.50E-01	1.40E-01	N/A	1.10E+00 c	N/A		NO	BSL
	205-99-2	BENZO[B]FLUORANTHENE	1.40E-01 J	1.40E-01 J	mg/kg	WASD13	WASD13-000005	1 / 8	2.10E-01 - 3.50E-01	1.40E-01	N/A	1.10E+01 c	N/A		NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	4.20E-01	5.80E-01	mg/kg	WASD13	WASD13-000005	2 / 8	2.10E-01 - 3.50E-01	5.80E-01	N/A	3.90E+02 c	N/A		NO	BSL
	218-01-9	CHRYSENE	1.90E-01 J	2.10E-01 J	mg/kg	WASD13	WASD13-000005	2 / 8	2.10E-01 - 3.50E-01	2.10E-01	N/A	1.10E+03 c	N/A		NO	BSL
	206-44-0	FLUORANTHENE	2.10E-01 J	2.20E-01 J	mg/kg	WASD11	WASD11-000005	2 / 8	4.00E-01 - 6.70E-01	2.20E-01	N/A	2.40E+03 n	N/A		NO	BSL
	85-01-8	PHENANTHRENE	2.25E-01 J	2.60E-01	mg/kg	WASD11	WASD11-000005	2 / 8	2.10E-01 - 3.50E-01	2.60E-01	N/A	1.80E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	2.15E-01 J	3.10E-01	mg/kg	WASD11	WASD11-000005	2 / 8	2.10E-01 - 3.50E-01	3.10E-01	N/A	1.80E+03 n	N/A		NO	BSL
	11096-82-5	AROCLOR-1260	1.10E-01	1.10E-01	mg/kg	WASD13	WASD13-005020	1 / 8	4.00E-02 - 6.80E-02	1.10E-01	N/A	2.40E+00 c	N/A		NO	BSL
	NA	2,3,7,8-TCDD TEQ [7]	1.47E-05	3.10E-05	mg/kg	WASD11	WASD11-000005	2 / 2	N/A	3.10E-05	N/A	4.80E-05 c	N/A		NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	2.07E+03	9.77E+03	mg/kg	WASD10	WASD10-005020	8 / 8	N/A	9.77E+03	N/A	7.70E+04 n	N/A		NO	BSL
	7440-36-0	ANTIMONY	7.90E-01 J	3.00E+00 J	mg/kg	WASD12	WASD12-000005	4 / 8	5.10E+00 - 5.60E+00	3.00E+00	N/A	3.10E+01 n	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**1.10E+00**	**2.51E+01**	mg/kg	**WASD13**	**WASD13-000005**	**8 / 8**	**N/A**	**2.51E+01**	**N/A**	**6.80E+00 c**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	2.72E+01	9.78E+01	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	9.78E+01	N/A	1.50E+04 n	N/A		NO	BSL
	7440-41-7	BERYLLIUM	1.30E-01 J	9.60E-01	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	9.60E-01	N/A	1.60E+02 n	N/A		NO	BSL
	7440-43-9	CADMIUM	2.70E-01 J	3.95E+00	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	3.95E+00	N/A	7.10E+01 n	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	1.08E+03	7.13E+04	mg/kg	WASD11	WASD11-005020	8 / 8	N/A	7.13E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	9.00E+00	2.80E+01	mg/kg	WASD12	WASD12-000005	8 / 8	N/A	2.80E+01	N/A	1.20E+05 n	N/A		NO	BSL
	7440-47-3	**CHROMIUM[6]**	**9.00E+00**	**2.80E+01**	**mg/kg**	**WASD12**	**WASD12-000005**	**8 / 8**	**N/A**	**2.80E+01**	**N/A**	**3.00E+00 c**	**N/A**		**YES**	**ASL**
	7440-48-4	COBALT	5.90E-01 J	3.50E+00 J	mg/kg	WASD11	WASD11-000005	8 / 8	N/A	3.50E+00	N/A	2.30E+01 n	N/A		NO	BSL
	7440-50-8	COPPER	6.70E+00	8.62E+01	mg/kg	WASD12	WASD12-000005	8 / 8	N/A	8.62E+01	N/A	3.10E+03 n	N/A		NO	BSL
	57-12-5	CYANIDE	3.10E-01 J	3.10E-01 J	mg/kg	WASD11	WASD11-005020	1 / 8	6.10E-01 - 9.20E-01	3.10E-01	N/A	2.30E+01 n	N/A		NO	BSL
	7439-89-6	IRON	5.85E+03	1.84E+04	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	1.84E+04	N/A	5.50E+04 n	N/A		NO	BSL
	7439-92-1	LEAD	1.13E+01	1.77E+02	mg/kg	WASD12	WASD12-000005	8 / 8	N/A	1.77E+02	N/A	2.00E+03	N/A		NO	BSL
	7439-95-4	MAGNESIUM	3.94E+02 J	2.34E+03	mg/kg	WASD11	WASD11-005020	8 / 8	N/A	2.34E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	8.50E+00	2.43E+02	mg/kg	WASD11	WASD11-005020	8 / 8	N/A	2.43E+02	N/A	1.80E+03 n	N/A		NO	BSL
	7439-97-6	MERCURY	4.70E-02 J-	7.50E-01	mg/kg	WASD12	WASD12-000005	6 / 8	1.10E-01 - 1.10E-01	7.50E-01	N/A	7.80E+00 n	N/A		NO	BSL
	7440-02-0	NICKEL	4.40E+00	2.20E+01	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	2.20E+01	N/A	1.50E+03 n	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.89E+02 J	4.72E+02 J	mg/kg	WASD11	WASD11-005020	8 / 8	N/A	4.72E+02	N/A	N/A	N/A		NO	NUT
	7782-49-2	SELENIUM	6.00E-01 J+	1.90E+00 J+	mg/kg	WASD13	WASD13-000005	6 / 8	3.00E+00 - 3.20E+00	1.90E+00	N/A	3.90E+02 n	N/A		NO	BSL
	7440-22-4	SILVER	2.70E-01 J	9.85E-01 J	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	9.85E-01	N/A	3.90E+02 n	N/A		NO	BSL
	7440-23-5	SODIUM	7.07E+01 J	6.95E+02	mg/kg	WASD11	WASD11-005020	8 / 8	N/A	6.95E+02	N/A	N/A	N/A		NO	NUT
	7440-62-2	VANADIUM (FUME OR DUST)	1.46E+01	3.69E+01	mg/kg	WASD12	WASD12-000005	8 / 8	N/A	3.69E+01	N/A	3.90E+02 n	N/A		NO	BSL
	7440-66-6	ZINC	2.73E+01	2.71E+02 J	mg/kg	WASD13	WASD13-000005	8 / 8	N/A	2.71E+02	N/A	2.30E+04 n	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**5.92E-01 J**	**9.64E-01 J**	**pCi/g**	**WASD10**	**WASD10-000005**	**8 / 8**	**N/A**	**9.64E-01**	**N/A**	**1.76E-01 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**5.57E-01 J**	**1.37E+00 J**	**pCi/g**	**WASD10**	**WASD10-000005**	**8 / 8**	**N/A**	**1.37E+00**	**N/A**	**1.55E-01 c**	**N/A**		**YES**	**ASL**
	10045-97-3	CESIUM-137	1.17E-02	2.03E-01	pCi/g	WASD10	WASD10-000005	7 / 7	N/A	2.03E-01	N/A	5.03E-01 c	N/A		NO	BSL
	14255-04-0	LEAD-210	4.60E-01 J	1.68E+00 J	pCi/g	WASD10	WASD10-000005	8 / 8	N/A	1.68E+00	N/A	1.77E+00 c	N/A		NO	BSL
	15092-94-1	**LEAD-212**	**4.42E-01 J**	**7.82E-01 J**	**pCi/g**	**WASD11**	**WASD11-005020**	**8 / 8**	**N/A**	**7.82E-01**	**N/A**	**1.65E-01 c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**6.10E-01 J**	**1.52E+00 J**	**pCi/g**	**WASD10**	**WASD10-000005**	**8 / 8**	**N/A**	**1.52E+00**	**N/A**	**1.39E-01 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**5.12E+00**	**8.85E+00**	**pCi/g**	**WASD11**	**WASD11-005020**	**8 / 8**	**N/A**	**8.85E+00**	**N/A**	**1.58E+00 c**	**N/A**		**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**1.09E+00 J**	**2.64E+00 J**	**pCi/g**	**WASD10**	**WASD10-000005**	**8 / 8**	**N/A**	**2.64E+00**	**N/A**	**1.37E-01 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**5.04E-01**	**8.23E-01**	**pCi/g**	**WASD11**	**WASD11-005020**	**8 / 8**	**N/A**	**8.23E-01**	**N/A**	**1.04E-01 c**	**N/A**		**YES**	**ASL**
	10098-97-2	STRONTIUM-90	2.88E-01	2.88E-01	pCi/g	WASD11	WASD11-005020	1 / 8	2.81E-01 - 3.76E-01	2.88E-01	N/A	3.13E+01 c	N/A		NO	BSL
	14913-50-9	**THALLIUM-208**	**1.52E-01 J**	**2.57E-01 J**	**pCi/g**	**WASD11**	**WASD11-005020**	**8 / 8**	**N/A**	**2.57E-01**	**N/A**	**6.78E-02 c**	**N/A**		**YES**	**ASL**
	15065-10-8	**THORIUM-234**	**3.65E-01 J**	**1.16E+00 J**	**pCi/g**	**WASD10**	**WASD10-000005**	**8 / 8**	**N/A**	**1.16E+00**	**N/A**	**1.34E-01 c**	**N/A**		**YES**	**ASL**
	15117-96-1	URANIUM-235	4.89E-02 J	7.11E-02 J	pCi/g	WASD10	WASD10-000005	4 / 6	4.45E-02 - 5.04E-02	7.11E-02	N/A	5.05E-01 c	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for residential soil November 2017) (cancer risk 1E-05, non-cancer HQ = 1.0)
RSL value for methyl mercury used for mercury
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 1.64 acres (~10,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essentrial Nutrient (NUT)

[6] Chromium screened against both trivalent and hexavalent chromium RSLs.
[7] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

Table 2.5
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum Sediment Detection (mg/kg)	Maximum Sediment Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Concentration [2] Used for Screening	Units	Background [3] Value	Screening [4] Toxicity Value	Units	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Freshwater Wetland																			
	56-55-3	BENZO[A]ANTHRACENE	1.60E-01 J	1.60E-01 J	9.63E-05	9.63E-05	µg/m^3	WASD11	WASD11-000005	1 / 8	2.30E-04	µg/m^3	N/A	2.00E-01 c	µg/m^3	N/A		NO	BSL
	50-32-8	BENZO[A]PYRENE	1.40E-01 J	1.40E-01 J	1.25E-06	1.25E-06	µg/m^3	WASD11	WASD11-000005	1 / 8	2.33E-05	µg/m^3	N/A	8.80E-04 n	µg/m^3	N/A		NO	BSL
	205-99-2	BENZO[B]FLUORANTHENE	1.40E-01 J	1.40E-01 J	1.25E-06	1.25E-06	µg/m^3	WASD13	WASD13-000005	1 / 8	2.33E-05	µg/m^3	N/A	2.00E-01 c	µg/m^3	N/A		NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	4.20E-01	5.80E-01	3.76E-06	5.20E-06	µg/m^3	WASD13	WASD13-000005	2 / 8	9.65E-05	µg/m^3	N/A	5.10E+00 c	µg/m^3	N/A		NO	BSL
	218-01-9	CHRYSENE	1.90E-01 J	2.10E-01 J	1.70E-06	1.88E-06	µg/m^3	WASD13	WASD13-000005	2 / 8	3.50E-05	µg/m^3	N/A	2.00E-01 c	µg/m^3	N/A		NO	BSL
	206-44-0	FLUORANTHENE	2.10E-01 J	2.20E-01 J	1.88E-06	1.97E-06	µg/m^3	WASD11	WASD11-000005	2 / 8	3.66E-05	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	85-01-8	PHENANTHRENE	2.25E-01 J	2.60E-01	2.02E-06	2.33E-06	µg/m^3	WASD11	WASD11-000005	2 / 8	4.33E-05	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	129-00-0	PYRENE	2.15E-01 J	3.10E-01	2.38E-04	3.44E-04	µg/m^3	WASD11	WASD11-000005	2 / 8	7.83E-04	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	11096-82-5	AROCLOR-1260	1.10E-01	1.10E-01	2.20E-04	2.20E-04	µg/m^3	WASD13	WASD13-005020	1 / 8	4.88E-04	µg/m^3	N/A	2.10E-02 c	µg/m^3	N/A		NO	BSL
	NA	2,3,7,8-TCDD TEQ [7]	1.47E-05	3.10E-05	1.98E-08	4.16E-08	µg/m^3	WASD11	WASD11-000005	2 / 2	9.37E-08	µg/m^3	N/A	3.20E-07 c	µg/m^3	N/A		NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	2.07E+03	9.77E+03	1.86E-02	8.76E-02	µg/m^3	WASD10	WASD10-005020	8 / 8	1.63E+00	µg/m^3	N/A	2.20E+00 n	µg/m^3	N/A		NO	BSL
	7440-36-0	ANTIMONY	7.90E-01 J	3.00E+00 J	7.08E-06	2.69E-05	µg/m^3	WASD12	WASD12-000005	4 / 8	4.99E-04	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	7440-38-2	**ARSENIC**	**1.10E+00**	**2.51E+01**	**9.86E-06**	**2.25E-04**	**µg/m^3**	**WASD13**	**WASD13-000005**	**8 / 8**	**4.18E-03**	**µg/m^3**	**N/A**	**2.90E-03 c**	**µg/m^3**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	2.72E+01	9.78E+01	2.44E-04	8.77E-04	µg/m^3	WASD13	WASD13-000005	8 / 8	1.63E-02	µg/m^3	N/A	2.20E-01 n	µg/m^3	N/A		NO	BSL
	7440-41-7	BERYLLIUM	1.30E-01 J	9.60E-01	1.17E-06	8.60E-06	µg/m^3	WASD13	WASD13-000005	8 / 8	1.60E-04	µg/m^3	N/A	5.10E-03 c	µg/m^3	N/A		NO	BSL
	7440-43-9	CADMIUM	2.70E-01 J	3.95E+00	2.42E-06	3.54E-05	µg/m^3	WASD13	WASD13-000005	8 / 8	6.58E-04	µg/m^3	N/A	4.40E-03 n	µg/m^3	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	1.08E+03	7.13E+04	9.68E-03	6.39E-01	µg/m^3	WASD11	WASD11-005020	8 / 8	1.19E+01	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	9.00E+00	2.80E+01	8.07E-05	2.51E-04	µg/m^3	WASD12	WASD12-000005	8 / 8	4.66E-03	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	7440-47-3	**CHROMIUM[6]**	**9.00E+00**	**2.80E+01**	**8.07E-05**	**2.51E-04**	**µg/m^3**	**WASD12**	**WASD12-000005**	**8 / 8**	**4.66E-03**	**µg/m^3**	**N/A**	**1.50E-04 c**	**µg/m^3**	**N/A**		**YES**	**ASL**
	7440-48-4	COBALT	5.90E-01 J	3.50E+00 J	5.29E-06	3.14E-05	µg/m^3	WASD11	WASD11-000005	8 / 8	5.83E-04	µg/m^3	N/A	1.40E-03 c	µg/m^3	N/A		NO	BSL
	7440-50-8	COPPER	6.70E+00	8.62E+01	6.01E-05	7.73E-04	µg/m^3	WASD12	WASD12-000005	8 / 8	1.43E-02	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	57-12-5	CYANIDE	3.10E-01 J	3.10E-01 J	2.78E-06	2.78E-06	µg/m^3	WASD11	WASD11-005020	1 / 8	5.16E-05	µg/m^3	N/A	3.50E-01 n	µg/m^3	N/A		NO	BSL
	7439-89-6	IRON	5.85E+03	1.84E+04	5.24E-02	1.65E-01	µg/m^3	WASD13	WASD13-000005	8 / 8	3.06E+00	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	7439-92-1	LEAD	1.13E+01	1.77E+02	1.01E-04	1.59E-03	µg/m^3	WASD12	WASD12-000005	8 / 8	2.95E-02	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	7439-95-4	MAGNESIUM	3.94E+02 J	2.34E+03	3.53E-03	2.10E-02	µg/m^3	WASD11	WASD11-005020	8 / 8	3.90E-01	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**8.50E+00**	**2.43E+02**	**7.62E-05**	**2.18E-03**	**µg/m^3**	**WASD11**	**WASD11-005020**	**8 / 8**	**4.04E-02**	**µg/m^3**	**N/A**	**2.20E-02 n**	**µg/m^3**	**N/A**		**YES**	**ASL**
	7439-97-6	MERCURY	4.70E-02 J-	7.50E-01	2.37E-02	3.79E-01	µg/m^3	WASD12	WASD12-000005	6 / 8	1.25E-04	µg/m^3	N/A	1.30E-01 n	µg/m^3	N/A		NO	BSL
	7440-02-0	NICKEL	4.40E+00	2.20E+01	3.94E-05	1.97E-04	µg/m^3	WASD13	WASD13-000005	8 / 8	3.65E-03	µg/m^3	N/A	3.90E-02 n	µg/m^3	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.89E+02 J	4.72E+02 J	1.69E-03	4.23E-03	µg/m^3	WASD11	WASD11-005020	8 / 8	7.86E-02	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NUT
	7782-49-2	SELENIUM	6.00E-01 J+	1.90E+00 J+	5.38E-06	1.70E-05	µg/m^3	WASD13	WASD13-000005	6 / 8	3.16E-04	µg/m^3	N/A	8.80E+00 n	µg/m^3	N/A		NO	BSL
	7440-22-4	SILVER	2.70E-01 J	9.85E-01 J	2.42E-06	8.83E-06	µg/m^3	WASD13	WASD13-000005	8 / 8	1.64E-04	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	7440-23-5	SODIUM	7.07E+01 J	6.95E+02	6.34E-04	6.23E-03	µg/m^3	WASD11	WASD11-005020	8 / 8	1.16E-01	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NUT
	7440-62-2	VANADIUM (FUME OR DUST)	1.46E+01	3.69E+01	1.31E-04	3.31E-04	µg/m^3	WASD12	WASD12-000005	8 / 8	6.14E-03	µg/m^3	N/A	4.40E-02 n	µg/m^3	N/A		NO	BSL
	7440-66-6	ZINC	2.73E+01	2.71E+02 J	2.45E-04	2.43E-03	µg/m^3	WASD13	WASD13-000005	8 / 8	4.51E-02	µg/m^3	N/A	N/A	µg/m^3	N/A		NO	NTX
	14913-49-6	BISMUTH-212	5.92E-01 J	9.64E-01 J	5.31E-06	8.64E-06	pCi/m^3	WASD10	WASD10-000005	8 / 8	1.60E-04	pCi/m^3	N/A	5.45E-02 c	pCi/m^3	N/A		NO	BSL
	14733-03-0	**BISMUTH-214**	**5.57E-01 J**	**1.37E+00 J**	**4.99E-06**	**1.23E-05**	**pCi/m^3**	**WASD10**	**WASD10-000005**	**8 / 8**	**2.28E-04**	**pCi/m^3**	**N/A**	**2.01E-04 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	10045-97-3	CESIUM-137	1.17E-02	2.03E-01	1.05E-07	1.82E-06	pCi/m^3	WASD10	WASD10-000005	7 / 7	3.38E-05	pCi/m^3	N/A	5.50E-02 c	pCi/m^3	N/A		NO	BSL
	14255-04-0	**LEAD-210**	**4.60E-01 J**	**1.68E+00 J**	**4.12E-06**	**1.51E-05**	**pCi/m^3**	**WASD10**	**WASD10-000005**	**8 / 8**	**2.80E-04**	**pCi/m^3**	**N/A**	**2.01E-04 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	15092-94-1	LEAD-212	4.42E-01 J	7.82E-01 J	3.96E-06	7.00E-06	pCi/m^3	WASD11	WASD11-005020	8 / 8	1.30E-04	pCi/m^3	N/A	8.36E-03 c	pCi/m^3	N/A		NO	BSL
	15067-28-4	**LEAD-214**	**6.10E-01 J**	**1.52E+00 J**	**5.47E-06**	**1.36E-05**	**pCi/m^3**	**WASD10**	**WASD10-000005**	**8 / 8**	**2.53E-04**	**pCi/m^3**	**N/A**	**2.01E-04 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	13966-00-2	POTASSIUM-40	5.12E+00	8.85E+00	4.59E-05	7.93E-05	pCi/m^3	WASD11	WASD11-005020	8 / 8	1.47E-03	pCi/m^3	N/A	2.80E-02 c	pCi/m^3	N/A		NO	BSL
	13982-63-3	**RADIUM-226**	**1.09E+00 J**	**2.64E+00 J**	**9.77E-06**	**2.37E-05**	**pCi/m^3**	**WASD10**	**WASD10-000005**	**8 / 8**	**4.39E-04**	**pCi/m^3**	**N/A**	**1.05E-04 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**5.04E-01**	**8.23E-01**	**4.52E-06**	**7.37E-06**	**pCi/m^3**	**WASD11**	**WASD11-005020**	**8 / 8**	**1.37E-04**	**pCi/m^3**	**N/A**	**3.30E-05 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	10098-97-2	STRONTIUM-90	2.88E-01	2.88E-01	2.58E-06	2.58E-06	pCi/m^3	WASD11	WASD11-005020	1 / 8	4.79E-05	pCi/m^3	N/A	1.43E-02 c	pCi/m^3	N/A		NO	BSL
	14913-50-9	THALLIUM-208	1.52E-01 J	2.57E-01 J	1.36E-06	2.30E-06	pCi/m^3	WASD11	WASD11-005020	8 / 8	4.27E-05	pCi/m^3	N/A	2.53E+00 c	pCi/m^3	N/A		NO	BSL
	15065-10-8	**THORIUM-234**	**3.65E-01 J**	**1.16E+00 J**	**3.27E-06**	**1.04E-05**	**pCi/m^3**	**WASD10**	**WASD10-000005**	**8 / 8**	**1.93E-04**	**pCi/m^3**	**N/A**	**5.13E-05 c**	**pCi/m^3**	**N/A**		**YES**	**ASL**
	15117-96-1	URANIUM-235	4.89E-02 J	7.11E-02 J	4.38E-07	6.37E-07	pCi/m^3	WASD10	WASD10-000005	4 / 6	1.18E-05	pCi/m^3	N/A	1.98E-05 c	pCi/m^3	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for industrial air (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for xylenes used for m,p-xylene.
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene
RSL value for Aroclor-1260 used for Aroclor-1268
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 1 km^2 with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)
[6] Chromium screened against both trivalent and hexavalent chromium RSLs.
[7] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
µg/m^3 = micrograms per cubic meter
N/A = Not available
pCi/m^3 = picocuries per cubic meter

Air concentration = soil concentration x (1/PEF + 1/VF)
PEF = particulate emission factor; VF = volatilization factor
PEF for construction worker = 1.1 x 10^9 m^3/kg (Calculated using equations 5-5 and 5-6 from EPA, 2002, see Table 2.5a).
VF calculated in Table 2.5b using equations from EPA, 2002.
PEF and VF calculations based on assumed maximum area of exposed trench that would be open at a given time during a utility worker project, estimated to be 100 linear feet of a 16 feet wide trench.

Table 2.5a
Calculation of Construction Worker Exposure Scenario PEF

Construction Scenario PEF (m^3/kg) (Lowest of Excavation Activities and Wind PEF and Contribution from Traffic on Unpaved Road PEF) = 1.12E+08

Traffic on Unpaved Road PEF

$$PEF_{SC} = {}^{Q}/_{C_{Sr}} \times \frac{1}{F_D} \times \frac{T \times A_R}{556 \times ({}^{W}/_{3})^{0.4} \times \left(\frac{365\ d/yr - p}{365\ d/yr}\right) \times \sum VKT}$$

Equation 5-5 from EPA, 2002

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

Equation 5-6 from EPA, 2002

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

Equation E-16 from Appendix E of EPA, 2002

Variable	Value	Units	Definition	Source
A	12.9	unitless	Constant	Default
B	5.74	unitless	Constant	Default
C	71.8	unitless	Constant	Default
T	31,500,000	seconds	Total time over which construction occurs	Assumed
AR	74	m^2	Surface area of contaminated road segment	Calculated, site-specific (square root of site surface contamination configured as a square x default width of road segment of 20 ft)
s	8.50	%	Road surface silt content	Default
W	11	tons	Mean weight of vehicle	Assumed (5 x 2-ton and 5 x 20-ton trucks per day)
Mdry	0.2	%	Road surface material moisture content under dry, uncontrolled conditions	Default
p	120	days	Number of days with at least 0.01 inches of precipitation	Lookup value (Exhibit 5-2 from EPA, 2002)
# days/truck	260	days		Assumed (5 days per week for 52 weeks)
SVKT	63	km	Sum of fleet vehicle kilometers traveled during the exposure duration	Assumed (3 vehicles x 0.045 km/day x 250 days)
LR	40	feet	Road length	Assumed (square root of the area)
WR	20	feet	Road width	Assumed
As	0.0367	acres	Areal extent of site (or site contamination)	Site-specific
tc	8,760	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.186	unitless	Dispersion correction factor	Calculated (Equation E-16 from Appendix E of EPA, 2002)
Q/Csr	40.4	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	Calculated (Equation 5-6 from EPA, 2002)
PEF		m^3/kg	Subchronic road particular emission factor	Calculated

Excavation Activities and Wind PEF

Site Assumptions

Variable	Value	Units	Source
Site Area	0.0367	acres	Site-specific
Site Area	1,599	square feet	Calculated, site-specific
Site Area	149	square meters	Calculated, site-specific
Site length	40	feet, assumed to be a square	Calculated, site-specific
# passes	6	# passes to cover entire site	Calculated, site-specific

Wind Erosion (Equation E-20 from Appendix E of EPA, 2002)

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760\ hr/yr$$

Variable	Value	Units	Definition	Source
V	0	unitless	Fraction of vegetative cover	Default
Um	4.69	m/s	Mean annual windspeed	Default
Ut	11.3	m/s	Equivalent threshold value of windspeed at 7m	Default
F(x)	0.194	unitless	Faction dependent on Um/Ut derived	Default
Asurf	149	m2	Areal extent of site with undisturbed surface soil contamination	Site-specific, calculated
ED	0.054794521	year	Exposure duration	Assumed (20-day duration)
Mwind	35	g	Unit mass emitted from wind erosion	Calculated

Excavation Emissions (Equation E-21 from Appendix E of EPA, 2002)

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times A_{excav} \times D_{excav} \times N_A \times 10^3\ g/kg$$

Variable	Value	Units	Definition	Source
Um	4.69	m/s	Mean windspeed during construction	Default
M	12	%	Gravimetric soil moisture content	Default
Psoil	1.68	Mg/m3	In-situ soil density	Default
Aexcav	149	m2	Areal extent of excavation	Assumed (all of the trench area is graded)
dexcav	3.03030303	m	Average depth of excavation	Assumed (10-foot excavation)
NA	2	unitless	Number of times soil is dumped	Default
Mexcav	184.4943507	g	Unit mass emitted from excavation	Calculated

Dozing Emissions (Equation E-22 from Appendix E of EPA, 2002)

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
s	6.9	%	Soil silt content	Default
M	7.9	%	Gravimetric soil moisture content	Default
SVKT	0.15	km	Sum of dozing kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
S	11.4	kph	Average dozing speed	Default
Mdoz	4.346593279	g	Unit mass emitted from dozing operations	Calculated

Grading Emissions (Equation E-23 from Appendix E of EPA, 2002)

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
S	11.4	kph	Average grading speed	Default
SVKT	0.15	km	Sum of grading kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
Mgrade	63.87535842	g	Unit mass emitted from grading operations	Calculated

Tilling Emissions (Equation E-24 from Appendix E of EPA, 2002)

$$M_{till} = 1.1(s)^{0.6} \times A_{till} \times 4{,}047\, m^2/acre \times 10^{-4}\, ha/m^2 \times 10^3 g/kg \times N_A$$

Variable	Value	Units	Definition	Source
s	18	%	Soil silt content	Default
Atill	0.01835	acre	Areal extent of tilling	Calculated (assume one-half the site is tilled for re-vegetation)
NA	2	unitless	Number of times soil is tilled	Default
Mtill	0	g	Unit mass emitted from tilling or similar operations	Assumed no tilling takes place for trenching

<J'T> - unit emission flux (Equation E-25 from Appendix E of EPA, 2002)

$$< J_T^{..} >= \frac{M_{wind} + M_{ecav} + M_{doz} + M_{grade} + M_{till}}{A_c \times T}$$

Variable	Value	Units	Definition	Source
Ac	148.595702	m2	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
T	1728000	s	Duration of construction	Assumed (20-day duration)
<J'T>	1.12217E-06	g/m2-s	Total time-averaged unit emission flux for construction activities other than traffic on unpaved road	

Table 2.5a
Calculation of Construction Worker Exposure Scenario PEF

PEF'sc (Equation E-26 from Appendix E of EPA, 2002)

$$PEF''_{sc} = Q/C_{sa} \times \frac{1}{F_D} \times \frac{1}{< J''_T >}$$

Variable	Value	Units	Definition	Source
Ac	0.0367	acres	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration and the emission flux at the center of the square emission source	Calculated (equation E-15 from Appendix E of EPA, 2002)
tc	480	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.196311737	unitless	Dispersion correction factor	Calculated (equation E-16 from Appendix E of EPA, 2002)
PEF'sc	1.12E+08	m3/kg	Subchronic particulate emission factor for construction activities other than traffic on unpaved roads	

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

Table 2.5b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario

Chemical		Diffusivity in Air (Di) (cm2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (Dw) (cm2/s)	Soil Organic Carbon Partition Coeff. (Koc) (cm3/g)	Soil Water Partition Coeff. (Kd = Koc x Foc) (g/cm3)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (DA) (cm2/s)	Volatilization Factor (VF) (m3/kg)
Volatile Organics									
2-Butanone (Methyl ethyl ketone)	78-93-3	9.14E-02	2.33E-03	1.02E-05	4.51E+00	2.71E-02	2.23E+05	8.94E-05	4.66E+03
Acetone	67-64-1	1.06E-01	1.43E-03	1.15E-05	2.36E+00	1.42E-02	1.00E+06	7.1E-05	5.2E+03
Carbon Disulfide	75-15-0	1.06E-01	5.89E-01	1.30E-05	2.17E+01	1.30E-01	2.16E+03	9.8E-03	4.5E+02
Methylene chloride	75-09-2	1.0E-01	1.3E-01	1.3E-05	2.2E+01	1.30E-01	1.3E+04	2.8E-03	8.4E+02
2-Methylnaphthalene	91-57-6	5.2E-02	2.1E-02	7.8E-06	2.5E+03	1.49E+01	2.5E+01	4.0E-06	2.2E+04
Acenaphthene	83-32-9	5.1E-02	7.5E-03	8.3E-06	5.0E+03	3.02E+01	3.9E+00	6.7E-07	5.4E+04
Acetophenone	98-86-2	6.5E-02	4.3E-04	8.7E-06	5.2E+01	3.11E-01	6.1E+03	3.7E-06	2.3E+04
Anthracene	120-12-7	3.9E-02	2.3E-03	7.9E-06	1.6E+04	9.82E+01	4.3E-02	4.9E-08	2.0E+05
Benzo(a)anthracene	56-55-3	2.61E-02	4.91E-04	6.75E-06	1.77E+05	1.06E+03	9.40E-03	6.8E-10	1.7E+06
Biphenyl	92-52-4	4.70E-02	1.26E-02	7.60E-06	5.10E+03	3.06E+01	4.00E+00	1.0E-06	1.5E+04
Dibenzofuran	132-64-9	6.51E-02	8.71E-03	7.38E-06	9.16E+03	5.50E+01	3.10E+00	5.5E-07	5.9E+04
Fluorene	86-73-7	4.4E-02	3.9E-03	7.9E-06	9.2E+03	5.50E+01	1.7E+00	1.7E-07	1.1E+05
Naphthalene	91-20-3	6.0E-02	1.8E-02	8.4E-06	1.5E+03	9.26E+00	3.1E+01	6.2E-06	1.8E+04
Pyrene	129-00-0	2.8E-02	4.9E-04	7.2E-06	5.4E+04	3.26E+02	1.4E-01	2.3E-09	9.1E+05
4,4'-DDE	72-55-9	2.3E-02	1.7E-03	5.9E-06	1.2E+05	7.05E+02	4.0E-02	3.0E-09	8.0E+05
Aldrin	309-00-2	2.3E-02	1.8E-03	5.8E-06	8.2E+04	4.92E+02	1.7E-02	4.5E-09	6.6E+05
Chlordane	12789-03-6	2.1E-02	2.0E-03	5.4E-06	6.8E+04	4.05E+02	5.6E-02	5.7E-09	5.8E+05
Heptachlor	76-44-8	2.2E-02	1.2E-02	5.7E-06	4.1E+04	2.48E+02	1.8E-01	5.8E-08	1.8E+05
Aroclor-1248	12672-29-6	1.63E-02	1.80E-02	3.94E-06	7.65E+04	4.59E+02	1.00E-01	3.4E-08	2.4E+05
Aroclor-1254	11097-69-1	2.37E-02	1.16E-02	6.10E-06	1.31E+05	7.83E+02	4.30E-02	1.9E-08	3.2E+05
Aroclor-1260	11096-82-5	2.20E-02	1.37E-02	5.61E-06	3.50E+05	2.10E+03	1.44E-02	7.7E-09	5.0E+05
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	4.24E-02	2.07E-03	5.69E-06	3.50E+05	2.10E+03	7.53E-04	2.3E-09	9.3E+05
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	4.67E-02	1.16E-02	6.06E-06	1.31E+05	7.83E+02	3.40E-03	3.7E-08	2.3E+05
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	4.44E-02	2.80E-03	5.86E-06	2.09E+05	1.26E+03	2.23E-03	5.3E-09	6.0E+05
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	4.67E-02	3.78E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	1.2E-08	4.0E+05
2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	4.67E-02	7.77E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	2.5E-08	2.8E+05
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	4.67E-02	1.18E-02	6.06E-06	1.28E+05	7.67E+02	1.34E-02	3.8E-08	2.3E+05
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	4.67E-02	7.77E-03	6.06E-06	1.28E+05	7.67E+02	7.33E-03	2.5E-08	2.8E+05
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	4.94E-02	9.12E-03	6.27E-06	7.81E+04	4.69E+02	3.22E-02	5.1E-08	1.9E+05
2,3,7,8-TCDD	1746-01-6	4.70E-02	2.04E-03	6.76E-06	2.49E+05	1.49E+03	2.00E-04	3.5E-09	7.5E+05
Polychlorinated Biphenyls (high risk)	NA	2.43E-02	1.70E-02	6.27E-06	7.81E+04	4.69E+02	7.00E-01	4.7E-08	2.0E+05
Mercury	7439-97-6	3.10E-02	3.50E-01	6.30E-06	NA	1.00E+00	6.00E-02	5.0E-04	2.0E+03

Volatilization factor (VF) (m^3/kg)
Equation 5-14 of EPA, 2002

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4}\, m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Apparent Diffusivity (DA) (cm^2/s)
Equation 5-14 of EPA, 2002

$$D_A = \frac{\left[\left(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w\right)/n^2\right]}{\rho_b K_d + \theta_w + \theta_a H'}$$

Table 2.5b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario

Variable	Value	Unit	Definition	Source
Q/C =	132.8562746	g/m^2-s per kg/m^3	Q/Csa * (1/Fd)	Intermediate calculation
Fd	0.185	unitless	Dispersion correction factor	Default
Qa	0.28	Lair/Lwater	Air-filled soil porosity	n - Qw (Equation 5-14 of EPA, 2002)
n	0.43	Lpore/Lsoil	Total soil porosity	1 - (rb/rs) (Equation 5-14 of EPA, 2002)
Qw	0.15	Lwater/Lsoil	Water-filled soil porosity	Default
rs	2.65	g/cm^3	Soil particle density	Default
rb	1.5	g/cm^3	Dry soil bulk density	Default
T	3.154E+07	seconds	Total time over which construction occurs	Calculated (1-year duration)
foc	0.006	g/g	Fraction organic carbon in soil	Default
A	2.4538	unitless	Constant	Default
Ac	0.0367	acres	Areal extent of soil contamination	Site-specific
B	17.566	unitless	Constant	Default
C	189.0426	unitless	Constant	Default
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the volatilization flux at the center of a square site	Calculated (Equation 5-15 of EPA, 2002)

Chemical and physical properties from parameter table for Regional Screening Levels, June 2017.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.

Table 2.6
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Estuarine Wetland																
	78-93-3	2-BUTANONE	5.10E-01	5.10E-01	mg/kg	PCWLSD13	PCWLSD13-005020	1 / 32	1.20E-02 - 4.80E-02	5.10E-01	N/A	2.70E+04 n	N/A		NO	BSL
	67-64-1	ACETONE	7.20E-02	9.60E-02	mg/kg	PCWLSD13	PCWLSD13-005020	2 / 32	1.20E-02 - 3.90E-02	9.60E-02	N/A	6.10E+04 n	N/A		NO	BSL
	75-15-0	CARBON DISULFIDE	5.00E-02	5.00E-02	mg/kg	HSTP07	HSTP07-005020	1 / 32	6.20E-03 - 2.00E-02	5.00E-02	N/A	7.70E+02 n	N/A		NO	BSL
	75-09-2	METHYLENE CHLORIDE	5.30E-03 J	1.90E-02 J	mg/kg	PCWLSD17; PCWLSD16	PCWLSD17-005020; PCWLSD16-005020	4 / 32	6.20E-03 - 2.40E-02	1.90E-02	N/A	3.50E+02 n	N/A		NO	BSL
	606-20-2	2,6-DINITROTOLUENE	6.20E-01 J	6.20E-01 J	mg/kg	PCWLSD13	PCWLSD13-000005	1 / 66	2.10E-01 - 7.70E-01	6.20E-01	N/A	3.60E+00 c	N/A		NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	9.70E-02 J	2.30E+00	mg/kg	WASD08	WASD08-005020	4 / 65	2.10E-01 - 8.00E-01	2.30E+00	N/A	2.40E+02 n	N/A		NO	BSL
	83-32-9	ACENAPHTHENE	9.20E-02 J	8.00E+00	mg/kg	WASD08	WASD08-005020	6 / 65	2.10E-01 - 8.00E-01	8.00E+00	N/A	3.60E+03 n	N/A		NO	BSL
	208-96-8	ACENAPHTHYLENE	3.40E-02 J	7.15E-01	mg/kg	WASD06	WASD06-005020	5 / 65	2.10E-01 - 8.00E-01	7.15E-01	N/A	3.60E+03 n	N/A		NO	BSL
	98-86-2	ACETOPHENONE	3.90E-01 J	1.10E+00	mg/kg	WASD02	WASD02-000005	2 / 65	4.00E-01 - 1.60E+00	1.10E+00	N/A	7.80E+03 n	N/A		NO	BSL
	120-12-7	ANTHRACENE	5.30E-02 J	1.80E+01	mg/kg	WASD08	WASD08-005020	8 / 65	2.10E-01 - 8.00E-01	1.80E+01	N/A	1.80E+04 n	N/A		NO	BSL
	56-55-3	**BENZO[A]ANTHRACENE**	**4.90E-02 J**	**2.40E+01**	**mg/kg**	**WASD08**	**WASD08-005020**	**13 / 65**	**2.10E-01 - 8.00E-01**	**2.40E+01**	**N/A**	**1.10E+01 c**	**N/A**		**YES**	**ASL**
	50-32-8	**BENZO[A]PYRENE**	**9.30E-02 J**	**2.00E+01**	**mg/kg**	**WASD08**	**WASD08-005020**	**11 / 65**	**2.10E-01 - 8.00E-01**	**2.00E+01**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	205-99-2	**BENZO[B]FLUORANTHENE**	**1.30E-01 J**	**1.90E+01**	**mg/kg**	**WASD08**	**WASD08-005020**	**14 / 65**	**2.10E-01 - 8.00E-01**	**1.90E+01**	**N/A**	**1.10E+01 c**	**N/A**		**YES**	**ASL**
	191-24-2	BENZO[G,H,I]PERYLENE	3.60E-02 J	8.50E+00	mg/kg	WASD08	WASD08-005020	12 / 65	2.10E-01 - 8.00E-01	8.50E+00	N/A	1.80E+03 n	N/A		NO	BSL
	207-08-9	BENZO[K]FLUORANTHENE	7.40E-02 J	1.50E+01	mg/kg	WASD08	WASD08-005020	11 / 65	2.10E-01 - 8.00E-01	1.50E+01	N/A	1.10E+02 c	N/A		NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	8.40E-02 J	5.90E-01 J	mg/kg	PCWLSD09	PCWLSD09-000005	19 / 65	2.10E-01 - 7.70E-01	5.90E-01	N/A	N/A	N/A		NO	NTX
	92-52-4	BIPHENYL	5.80E-01	5.80E-01	mg/kg	WASD08	WASD08-005020	1 / 65	2.10E-01 - 8.00E-01	5.80E-01	N/A	4.70E+01 n	N/A		NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.00E-01 J	2.50E+00	mg/kg	WDSD01	WDSD01-000005	25 / 65	2.10E-01 - 7.70E-01	2.50E+00	N/A	3.90E+02 c	N/A		NO	BSL
	105-60-2	CAPROLACTAM	1.80E-01 J	4.40E-01 J	mg/kg	PCWLSD12	PCWLSD12-000005	6 / 65	4.00E-01 - 1.60E+00	4.40E-01	N/A	3.10E+04 n	N/A		NO	BSL
	86-74-8	CARBAZOLE	1.10E-01 J	7.70E+00	mg/kg	WASD08	WASD08-005020	6 / 65	2.30E-01 - 1.60E+00	7.70E+00	N/A	N/A	N/A		NO	NTX
	218-01-9	CHRYSENE	5.10E-02 J	2.20E+01	mg/kg	WASD08	WASD08-005020	13 / 65	2.10E-01 - 8.00E-01	2.20E+01	N/A	1.10E+03 c	N/A		NO	BSL
	53-70-3	**DIBENZ[A,H]ANTHRACENE**	**6.20E-02 J**	**4.00E+00**	**mg/kg**	**WASD08**	**WASD08-005020**	**7 / 65**	**2.10E-01 - 8.00E-01**	**4.00E+00**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	132-64-9	DIBENZOFURAN	3.90E-02 J	5.90E+00	mg/kg	WASD08	WASD08-005020	6 / 65	2.10E-01 - 8.00E-01	5.90E+00	N/A	7.30E+01 n	N/A		NO	BSL
	131-11-3	DIMETHYL PHTHALATE	2.50E-01 J	1.70E+00	mg/kg	HSTP07	HSTP07-005020	8 / 65	2.10E-01 - 8.00E-01	1.70E+00	N/A	N/A	N/A		NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	2.90E-02 J	9.80E-01	mg/kg	WDSD01	WDSD01-000005	11 / 65	2.10E-01 - 7.70E-01	9.80E-01	N/A	6.30E+03 n	N/A		NO	BSL
	117-84-0	DI-N-OCTYL PHTHALATE	1.20E-01 J	2.10E-01 J	mg/kg	WASD02; WDSD05	WASD02-005020; WDSD05-000005	10 / 65	4.00E-01 - 1.60E+00	2.10E-01	N/A	6.30E+02 n	N/A		NO	BSL
	206-44-0	FLUORANTHENE	6.30E-02 J	6.60E+01	mg/kg	WASD08	WASD08-005020	23 / 65	4.00E-01 - 1.60E+00	6.60E+01	N/A	2.40E+03 n	N/A		NO	BSL
	86-73-7	FLUORENE	9.80E-02 J	9.80E+00	mg/kg	WASD08	WASD08-005020	6 / 65	2.10E-01 - 8.00E-01	9.80E+00	N/A	2.40E+03 n	N/A		NO	BSL
	193-39-5	INDENO[1,2,3-CD]PYRENE	6.20E-02 J	8.80E+00	mg/kg	WASD08	WASD08-005020	9 / 65	2.10E-01 - 8.00E-01	8.80E+00	N/A	1.10E+01 c	N/A		NO	BSL
	91-20-3	NAPHTHALENE	5.10E-02 J	3.10E+00	mg/kg	WASD08	WASD08-005020	5 / 65	2.10E-01 - 8.00E-01	3.10E+00	N/A	3.80E+01 c	N/A		NO	BSL
	85-01-8	PHENANTHRENE	3.60E-02 J	7.10E+01	mg/kg	WASD08	WASD08-005020	14 / 65	2.10E-01 - 8.00E-01	7.10E+01	N/A	1.80E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	6.70E-02 J	5.10E+01	mg/kg	WASD08	WASD08-005020	23 / 65	2.10E-01 - 8.00E-01	5.10E+01	N/A	1.80E+03 n	N/A		NO	BSL
	72-54-8	4,4'-DDD	4.20E-03 J	8.45E-03 J+	mg/kg	WASD06	WASD06-005020	3 / 64	4.00E-03 - 1.57E-02	8.45E-03	N/A	1.90E+00 n	N/A		NO	BSL
	72-55-9	4,4'-DDE	2.40E-03 J	4.00E-03 J	mg/kg	PCWLSD15	PCWLSD15-005020	3 / 64	4.00E-03 - 1.57E-02	4.00E-03	N/A	2.00E+01 c	N/A		NO	BSL
	50-29-3	4,4'-DDT	1.90E-03 J	1.90E-03 J	mg/kg	WDSD05	WDSD05-005020	1 / 64	4.00E-03 - 1.57E-02	1.90E-03	N/A	1.90E+01 c	N/A		NO	BSL
	309-00-2	ALDRIN	1.20E-03 J+	2.60E-03 J+	mg/kg	WASD06	WASD06-005020	2 / 64	2.10E-03 - 9.60E-03	2.60E-03	N/A	3.90E-01 c	N/A		NO	BSL
	319-85-7	BETA-BHC	8.10E-04 J+	7.50E-03 J	mg/kg	WASD03	WASD03-000005	4 / 64	2.10E-03 - 8.07E-03	7.50E-03	N/A	3.00E+00 c	N/A		NO	BSL
	12789-03-6	CHLORDANE	1.30E-03	1.00E-02	mg/kg	WASD03	WASD03-000005	6 / 63	N/A	1.00E-02	N/A	1.70E+01 c	N/A		NO	BSL

Table 2.6
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	60-57-1	DIELDRIN	1.90E-03 J+	1.90E-03 J+	mg/kg	WASD06	WASD06-005020	1 / 64	4.00E-03 - 1.57E-02	1.90E-03	N/A	3.40E-01 c	N/A		NO	BSL
	1031-07-8	ENDOSULFAN SULFATE	1.80E-03 J+	1.80E-03 J+	mg/kg	WASD06	WASD06-005020	1 / 64	4.00E-03 - 1.57E-02	1.80E-03	N/A	4.70E+02 n	N/A		NO	BSL
	72-20-8	ENDRIN	9.70E-04 J-	1.95E-03 J+	mg/kg	WASD06	WASD06-005020	3 / 65	4.00E-03 - 1.57E-02	1.95E-03	N/A	1.90E+01 n	N/A		NO	BSL
	7421-93-4	ENDRIN ALDEHYDE	3.10E-03 J+	3.60E-03 J-	mg/kg	WASD03	WASD03-005020	3 / 65	4.00E-03 - 1.57E-02	3.60E-03	N/A	1.90E+01 n	N/A		NO	BSL
	53494-70-5	ENDRIN KETONE	2.00E-03 J-	1.09E-02 J+	mg/kg	WASD06	WASD06-005020	3 / 65	4.00E-03 - 1.57E-02	1.09E-02	N/A	1.90E+01 n	N/A		NO	BSL
	58-89-9	GAMMA-BHC (LINDANE)	2.00E-03 J	2.50E-03 J	mg/kg	WDSD05	WDSD05-005020	2 / 64	2.10E-03 - 8.07E-03	2.50E-03	N/A	5.70E+00 c	N/A		NO	BSL
	76-44-8	HEPTACHLOR	6.70E-04 J+	1.20E-03 J-	mg/kg	WASD03	WASD03-005020	3 / 65	2.10E-03 - 8.07E-03	1.20E-03	N/A	1.30E+00 c	N/A		NO	BSL
	72-43-5	METHOXYCHLOR	9.80E-03 J+	1.60E-02 J+	mg/kg	WASD06	WASD06-005020	2 / 64	2.10E-02 - 8.07E-02	1.60E-02	N/A	3.20E+02 n	N/A		NO	BSL
	12672-29-6	**AROCLOR-1248**	**5.60E+00 J+**	**5.60E+00 J+**	mg/kg	**HSTP07**	**HSTP07-000005**	**1 / 66**	**4.00E-02 - 1.60E-01**	**5.60E+00**	**N/A**	**2.30E+00 c**	**N/A**		**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**2.40E-02 J**	**1.40E+01**	mg/kg	**WDSD02**	**WDSD02-000005**	**8 / 65**	**4.10E-02 - 1.60E-01**	**1.40E+01**	**N/A**	**1.20E+00 n**	**N/A**		**YES**	**ASL**
	11096-82-5	**AROCLOR-1260**	**3.20E-02 J**	**1.60E+01 J+**	mg/kg	**HSTP07**	**HSTP07-000005**	**14 / 66**	**4.00E-02 - 1.60E-01**	**1.60E+01**	**N/A**	**2.40E+00 c**	**N/A**		**YES**	**ASL**
	NA	TEQ for PCB Congeners [7]	3.99E-07	1.17E-05	mg/kg	WDSD03	WDSD03-000005	5 / 5	N/A	1.17E-05	N/A	4.80E-05 c	N/A		NO	BSL
	NA	High Risk PCBs [8]	3.86E-03	1.99E+00	mg/kg	WASD04	WASD04-000005	5 / 5	N/A	1.99E+00	N/A	2.30E+00 c	N/A		NO	BSL
	NA	**2,3,7,8-TCDD TEQ [9]**	**2.92E-07**	**9.71E-05**	**mg/kg**	**WDSD01**	**WDSD01-005020**	**21 / 21**	**N/A**	**9.71E-05**	**N/A**	**4.80E-05 c**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	8.52E+02	2.74E+04 J	mg/kg	WASD02	WASD02-000005	66 / 66	N/A	2.74E+04	N/A	7.70E+04 n	N/A		NO	BSL
	7440-36-0	**ANTIMONY**	**6.40E-01 J**	**4.47E+02 J-**	mg/kg	**MP04**	**MP04-000005**	**26 / 66**	**4.70E+00 - 7.52E+01**	**4.47E+02**	**N/A**	**3.10E+01 n**	**N/A**		**YES**	**ASL**
	7440-38-2	**ARSENIC**	**3.90E-01 J-**	**1.23E+02**	mg/kg	**WDSD04**	**WDSD04-000005**	**65 / 65**	**N/A**	**1.23E+02**	**N/A**	**6.80E+00 c**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	7.10E+00 J	5.98E+02	mg/kg	WASD05	WASD05-005020	64 / 66	2.52E+01 - 1.40E+02	5.98E+02	N/A	1.50E+04 n	N/A		NO	BSL
	7440-41-7	BERYLLIUM	1.30E-01 J	5.60E+00	mg/kg	WASD05	WASD05-005020	56 / 64	4.70E-01 - 6.30E+00	5.60E+00	N/A	1.60E+02 n	N/A		NO	BSL
	7440-43-9	CADMIUM	1.80E-01 J-	3.16E+01 J-	mg/kg	MP04	MP04-000005	58 / 66	6.30E-01 - 3.50E+00	3.16E+01	N/A	7.10E+01 n	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	5.35E+02 J-	1.74E+05	mg/kg	WASD01	WASD01-000005	66 / 66	N/A	1.74E+05	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	9.60E+00 J	4.00E+04	mg/kg	WDSD04	WDSD04-000005	66 / 66	N/A	4.00E+04	N/A	1.20E+05 n	N/A		NO	BSL
	7440-47-3	**CHROMIUM[6]**	**9.60E+00 J**	**4.00E+04**	**mg/kg**	**WDSD04**	**WDSD04-000005**	**66 / 66**	**N/A**	**4.00E+04**	**N/A**	**3.00E+00 c**	**N/A**		**YES**	**ASL**
	18540-29-9	**CHROMIUM (HEXAVALENT**	**1.25E+00 J**	**4.45E+01**	mg/kg	**MP04**	**MP04-000005**	**6 / 24**	**4.90E-01 - 1.39E+00**	**4.45E+01**	**N/A**	**3.00E+00 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**1.70E+00 J**	**3.44E+04 J-**	mg/kg	**MP04**	**MP04-000005**	**66 / 66**	**N/A**	**3.44E+04**	**N/A**	**2.30E+01 n**	**N/A**		**YES**	**ASL**
	7440-50-8	**COPPER**	**9.00E+00**	**5.58E+03**	mg/kg	**WDSD01**	**WDSD01-000005**	**66 / 66**	**N/A**	**5.58E+03**	**N/A**	**3.10E+03 n**	**N/A**		**YES**	**ASL**
	57-12-5	CYANIDE	3.30E-01 J	1.70E+00 J-	mg/kg	MP04	MP04-000005	5 / 62	4.80E-01 - 7.30E+00	1.70E+00	N/A	2.30E+01 n	N/A		NO	BSL
	7439-89-6	**IRON**	**3.68E+03**	**2.91E+05 J-**	mg/kg	**MP04**	**MP04-000005**	**66 / 66**	**N/A**	**2.91E+05**	**N/A**	**5.50E+04 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**1.92E+01 J**	**3.60E+03**	**mg/kg**	**WASD08**	**WASD08-000005**	**66 / 66**	**N/A**	**3.60E+03**	**N/A**	**2.00E+03**	**N/A**		**YES**	**ASL**
	7439-95-4	MAGNESIUM	1.40E+02 J	7.82E+03	mg/kg	PCWLSD02	PCWLSD02-000005	65 / 66	3.50E+03 - 3.50E+03	7.82E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	1.46E+01	1.78E+03 J-	mg/kg	MP04	MP04-000005	66 / 66	N/A	1.78E+03	N/A	1.80E+03 n	N/A		NO	BSL
	7439-97-6	**MERCURY**	**5.00E-02 J**	**1.00E+02**	mg/kg	**WDSD03**	**WDSD03-000005**	**66 / 66**	**N/A**	**1.00E+02**	**N/A**	**7.80E+00 n**	**N/A**		**YES**	**ASL**
	7440-02-0	**NICKEL**	**1.25E+01**	**5.67E+04 J-**	mg/kg	**MP04**	**MP04-000005**	**66 / 66**	**N/A**	**5.67E+04**	**N/A**	**1.50E+03 n**	**N/A**		**YES**	**ASL**
	7440-09-7	POTASSIUM	4.67E+02	5.71E+03	mg/kg	PCWLSD02	PCWLSD02-000005	58 / 66	4.02E+02 - 6.27E+03	5.71E+03	N/A	N/A	N/A		NO	NUT
	7782-49-2	SELENIUM	1.10E+00 J+	1.03E+01 J+	mg/kg	WASD01	WASD01-000005	12 / 64	2.70E+00 - 2.55E+01	1.03E+01	N/A	3.90E+02 n	N/A		NO	BSL
	7440-22-4	SILVER	4.10E-01 J	7.88E+01 J-	mg/kg	WDSD01	WDSD01-000005	51 / 65	1.30E+00 - 7.00E+00	7.88E+01	N/A	3.90E+02 n	N/A		NO	BSL
	7440-23-5	SODIUM	7.37E+02	1.46E+04	mg/kg	WDSD04	WDSD04-000005	59 / 66	4.02E+02 - 6.27E+03	1.46E+04	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**2.80E-01 J**	**6.31E+01 J-**	mg/kg	**MP04**	**MP04-000005**	**36 / 65**	**2.10E+00 - 3.13E+01**	**6.31E+01**	**N/A**	**7.80E-01 n**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	1.80E+00 J	1.55E+02	mg/kg	WDSD04	WDSD04-000005	66 / 66	N/A	1.55E+02	N/A	3.90E+02 n	N/A		NO	BSL
	7440-66-6	ZINC	3.45E+01 J	2.20E+03 J-	mg/kg	MP04	MP04-000005	66 / 66	N/A	2.20E+03	N/A	2.30E+04 n	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**5.91E-01 J**	**1.42E+00 J**	**pCi/g**	**PCWLSD04**	**PCWLSD04-005020**	**36 / 36**	**N/A**	**1.42E+00**	**N/A**	**1.71E-01 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**3.73E-01 J**	**1.18E+00 J**	**pCi/g**	**PCWLSD08**	**PCWLSD08-005020**	**36 / 36**	**N/A**	**1.18E+00**	**N/A**	**1.48E-01 c**	**N/A**		**YES**	**ASL**
	10045-97-3	CESIUM-137	1.90E-02	3.76E-01	pCi/g	PCWLSD02	PCWLSD02-000005	27 / 27	N/A	3.76E-01	N/A	4.57E-01 c	N/A		NO	BSL
	15092-94-1	**LEAD-212**	**4.62E-01 J**	**1.24E+00 J**	**pCi/g**	**PCWLSD06**	**PCWLSD06-005020**	**36 / 36**	**N/A**	**1.24E+00**	**N/A**	**1.60E-01 c**	**N/A**		**YES**	**ASL**

Table 2.6
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	15067-28-4	**LEAD-214**	**4.23E-01 J**	**1.40E+00 J**	**pCi/g**	**PCWLSD08**	**PCWLSD08-005020**	**36 / 36**	**N/A**	**1.40E+00**	**N/A**	**1.32E-01 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**4.85E+00**	**1.86E+01**	**pCi/g**	**PCWLSD11**	**PCWLSD11-000005**	**36 / 36**	**N/A**	**1.86E+01**	**N/A**	**1.51E+00 c**	**N/A**		**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**3.00E-01 J**	**2.77E+00 J**	**pCi/g**	**WASD05**	**WASD05-005020**	**16 / 26**	**1.66E-01 - 1.98E+00**	**2.77E+00**	**N/A**	**1.30E-01 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**2.82E-01 J**	**1.99E+00 J**	**pCi/g**	**WASD05**	**WASD05-005020**	**53 / 62**	**1.81E-01 - 4.22E-01**	**1.99E+00**	**N/A**	**1.00E-01 c**	**N/A**		**YES**	**ASL**
	10098-97-2	STRONTIUM-90	4.10E-01 J	4.10E-01 J	pCi/g	WASD08	WASD08-000005	1 / 59	2.48E-01 - 8.10E-01	4.10E-01	N/A	3.13E+01 c	N/A		NO	BSL
	14913-50-9	**THALLIUM-208**	**1.56E-01 J**	**3.86E-01 J**	**pCi/g**	**PCWLSD06**	**PCWLSD06-005020**	**36 / 36**	**N/A**	**3.86E-01**	**N/A**	**6.61E-02 c**	**N/A**		**YES**	**ASL**
	15117-96-1	URANIUM-235	6.18E-02 J	1.70E-01 J	pCi/g	PCWLSD14	PCWLSD14-005020	7 / 16	5.51E-02 - 1.70E-01	1.70E-01	N/A	4.71E-01 c	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Levels (RSLs) for residential soil (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0).
RSL value for methyl mercury used for mercury
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 22.99 acres (~100,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
Deletion Reason:	Below Screening Level (BSL)
	No Screening Value (NTX)
	Essential Nutrient (NUT)

[6] Given the distribution of samples speciated for hexavalent chromium, total chromium results were screened against trivalent and hexavalent chromium RSLs.

[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

Table 2.7
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Exposure Point	CAS Number	Chemical	Minimum Sediment Detection (mg/kg)	Maximum Sediment Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Units	Background Value [3]	Screening Toxicity Value [4]	Units	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
Estuarine Wetland																				
	78-93-3	2-BUTANONE	5.10E-01	5.10E-01	1.09E-01	1.09E-01	µg/m³	PCWLSD13	PCWLSD13-005020	1 / 32	-	1.09E-01	µg/m³	N/A	2.20E+03 n	µg/m³			NO	BSL
	67-64-1	ACETONE	7.20E-02	9.60E-02	1.38E-02	1.84E-02	µg/m³	PCWLSD13	PCWLSD13-005020	2 / 32	-	1.84E-02	µg/m³	N/A	1.40E+04 n	µg/m³			NO	BSL
	75-15-0	CARBON DISULFIDE	5.00E-02	5.00E-02	1.12E-01	1.12E-01	µg/m³	HSTP07	HSTP07-005020	1 / 32	-	1.12E-01	µg/m³	N/A	3.10E+02 n	µg/m³			NO	BSL
	75-09-2	METHYLENE CHLORIDE	5.30E-03 J	1.90E-02 J	6.33E-03	2.27E-02	µg/m³	PCWLSD17; PCWLSD16	PCWLSD17-005020; PCWLSD16-005020	4 / 32	-	2.27E-02	µg/m³	N/A	2.60E+02 n	µg/m³			NO	BSL
	606-20-2	2,6-DINITROTOLUENE	6.20E-01 J	6.20E-01 J	5.56E-06	5.56E-06	µg/m³	PCWLSD13	PCWLSD13-000005	1 / 66	-	5.56E-06	µg/m³	N/A	N/A	µg/m³			NO	NTX
	91-57-6	2-METHYLNAPHTHALENE	9.70E-02 J	2.30E+00	4.38E-03	1.04E-01	µg/m³	WASD08	WASD08-005020	4 / 65	-	1.04E-01	µg/m³	N/A	N/A	µg/m³			NO	NTX
	83-32-9	ACENAPHTHENE	9.20E-02 J	8.00E+00	1.71E-03	1.49E-01	µg/m³	WASD08	WASD08-005020	6 / 65	-	1.49E-01	µg/m³	N/A	N/A	µg/m³			NO	NTX
	208-96-8	ACENAPHTHYLENE	3.40E-02 J	7.15E-01	3.05E-07	6.41E-06	µg/m³	WASD06	WASD06-005020	5 / 65	-	6.41E-06	µg/m³	N/A	N/A	µg/m³			NO	NTX
	98-86-2	ACETOPHENONE	3.90E-01 J	1.10E+00	1.71E-02	4.82E-02	µg/m³	WASD02	WASD02-000005	2 / 65	-	4.82E-02	µg/m³	N/A	N/A	µg/m³			NO	NTX
	120-12-7	ANTHRACENE	5.30E-02 J	1.80E+01	2.65E-04	9.02E-02	µg/m³	WASD08	WASD08-005020	8 / 65	-	9.02E-02	µg/m³	N/A	N/A	µg/m³			NO	NTX
	56-55-3	BENZO[A]ANTHRACENE	4.90E-02 J	2.40E+01	2.95E-05	1.45E-02	µg/m³	WASD08	WASD08-005020	13 / 65	-	1.45E-02	µg/m³	N/A	2.00E-01 c	µg/m³			NO	BSL
	50-32-8	BENZO[A]PYRENE	9.30E-02 J	2.00E+01	8.34E-07	1.79E-04	µg/m³	WASD08	WASD08-005020	11 / 65	-	1.79E-04	µg/m³	N/A	8.80E-04 n	µg/m³			NO	BSL
	205-99-2	BENZO[B]FLUORANTHENE	1.30E-01 J	1.90E+01	1.17E-06	1.70E-04	µg/m³	WASD08	WASD08-005020	14 / 65	-	1.70E-04	µg/m³	N/A	2.00E-01 c	µg/m³			NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	3.60E-02 J	8.50E+00	3.23E-07	7.62E-05	µg/m³	WASD08	WASD08-005020	12 / 65	-	7.62E-05	µg/m³	N/A	N/A	µg/m³			NO	NTX
	207-08-9	BENZO[K]FLUORANTHENE	7.40E-02 J	1.50E+01	6.63E-07	1.34E-04	µg/m³	WASD08	WASD08-005020	11 / 65	-	1.34E-04	µg/m³	N/A	2.00E+00 c	µg/m³			NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	8.40E-02 J	5.90E-01 J	7.53E-07	5.29E-06	µg/m³	PCWLSD09	PCWLSD09-000005	19 / 65	-	5.29E-06	µg/m³	N/A	N/A	µg/m³			NO	NTX
	92-52-4	BIPHENYL	5.80E-01	5.80E-01	3.87E-02	3.87E-02	µg/m³	WASD08	WASD08-005020	1 / 65	-	3.87E-02	µg/m³	N/A	1.80E-01 n	µg/m³			NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.00E-01 J	2.50E+00	1.79E-06	2.24E-05	µg/m³	WDSD01	WDSD01-000005	25 / 65	-	2.24E-05	µg/m³	N/A	5.10E+00 c	µg/m³			NO	BSL
	105-60-2	CAPROLACTAM	1.80E-01 J	4.40E-01 J	1.61E-06	3.94E-06	µg/m³	PCWLSD12	PCWLSD12-000005	6 / 65	-	3.94E-06	µg/m³	N/A	9.60E-01 n	µg/m³			NO	BSL
	86-74-8	CARBAZOLE	1.10E-01 J	7.70E+00	9.86E-07	6.90E-05	µg/m³	WASD08	WASD08-005020	6 / 65	-	6.90E-05	µg/m³	N/A	N/A	µg/m³			NO	NTX
	218-01-9	CHRYSENE	5.10E-02 J	2.20E+01	4.57E-07	1.97E-04	µg/m³	WASD08	WASD08-005020	13 / 65	-	1.97E-04	µg/m³	N/A	2.00E+01 c	µg/m³			NO	BSL
	53-70-3	DIBENZ[A,H]ANTHRACENE	6.20E-02 J	4.00E+00	5.56E-07	3.59E-05	µg/m³	WASD08	WASD08-005020	7 / 65	-	3.59E-05	µg/m³	N/A	2.00E-02 c	µg/m³			NO	BSL
	132-64-9	DIBENZOFURAN	3.90E-02 J	5.90E+00	6.56E-04	9.93E-02	µg/m³	WASD08	WASD08-005020	6 / 65	-	9.93E-02	µg/m³	N/A	N/A	µg/m³			NO	NTX
	131-11-3	DIMETHYL PHTHALATE	2.50E-01 J	1.70E+00	2.24E-06	1.52E-05	µg/m³	HSTP07	HSTP07-005020	8 / 65	-	1.52E-05	µg/m³	N/A	N/A	µg/m³			NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	2.90E-02 J	9.80E-01	2.60E-07	8.78E-06	µg/m³	WDSD01	WDSD01-000005	11 / 65	-	8.78E-06	µg/m³	N/A	N/A	µg/m³			NO	NTX
	117-84-0	DI-N-OCTYL PHTHALATE	1.20E-01 J	2.10E-01 J	1.08E-06	1.88E-06	µg/m³	WASD02; WDSD05	WASD02-005020; WDSD05-000005	10 / 65	-	1.88E-06	µg/m³	N/A	N/A	µg/m³			NO	NTX
	206-44-0	FLUORANTHENE	6.30E-02 J	6.60E+01	5.65E-07	5.92E-04	µg/m³	WASD08	WASD08-005020	23 / 65	-	5.92E-04	µg/m³	N/A	N/A	µg/m³			NO	NTX
	86-73-7	FLUORENE	9.80E-02 J	9.80E+00	9.13E-04	9.13E-02	µg/m³	WASD08	WASD08-005020	6 / 65	-	9.13E-02	µg/m³	N/A	N/A	µg/m³			NO	NTX
	193-39-5	INDENO[1,2,3-CD]PYRENE	6.20E-02 J	8.80E+00	5.56E-07	7.89E-05	µg/m³	WASD08	WASD08-005020	9 / 65	-	7.89E-05	µg/m³	N/A	2.00E-01 c	µg/m³			NO	BSL
	91-20-3	NAPHTHALENE	5.10E-02 J	3.10E+00	2.88E-03	1.75E-01	µg/m³	WASD08	WASD08-005020	5 / 65	-	1.75E-01	µg/m³	N/A	3.60E-01 c	µg/m³			NO	BSL
	85-01-8	PHENANTHRENE	3.60E-02 J	7.10E+01	3.23E-07	6.36E-04	µg/m³	WASD08	WASD08-005020	14 / 65	-	6.36E-04	µg/m³	N/A	N/A	µg/m³			NO	NTX
	129-00-0	PYRENE	6.70E-02 J	5.10E+01	7.43E-05	5.66E-02	µg/m³	WASD08	WASD08-005020	23 / 65	-	5.66E-02	µg/m³	N/A	N/A	µg/m³			NO	NTX
	72-54-8	4,4'-DDD	4.20E-03 J	8.45E-03 J+	3.76E-08	7.57E-08	µg/m³	WASD06	WASD06-005020	3 / 64	-	7.57E-08	µg/m³	N/A	1.80E-01 c	µg/m³			NO	BSL
	72-55-9	4,4'-DDE	2.40E-03 J	4.00E-03 J	3.01E-06	5.01E-06	µg/m³	PCWLSD15	PCWLSD15-005020	3 / 64	-	5.01E-06	µg/m³	N/A	1.30E-01 c	µg/m³			NO	BSL
	50-29-3	4,4'-DDT	1.90E-03 J	1.90E-03 J	1.70E-08	1.70E-08	µg/m³	WDSD05	WDSD05-005020	1 / 64	-	1.70E-08	µg/m³	N/A	1.30E-01 c	µg/m³			NO	BSL
	309-00-2	ALDRIN	1.20E-03 J+	2.60E-03 J+	1.84E-06	3.99E-06	µg/m³	WASD06	WASD06-005020	2 / 64	-	3.99E-06	µg/m³	N/A	2.50E-03 c	µg/m³			NO	BSL
	319-85-7	BETA-BHC	8.10E-04 J+	7.50E-03 J	7.26E-09	6.72E-08	µg/m³	WASD03	WASD03-000005	4 / 64	-	6.72E-08	µg/m³	N/A	2.30E-02 c	µg/m³			NO	BSL
	12789-03-6	CHLORDANE	1.30E-03	1.00E-02	2.24E-06	1.72E-05	µg/m³	WASD03	WASD03-000005	2 / 64	-	1.72E-05	µg/m³	N/A	1.20E-01 c	µg/m³			NO	BSL
	60-57-1	DIELDRIN	1.90E-03 J+	1.90E-03 J+	1.70E-08	1.70E-08	µg/m³	WASD06	WASD06-005020	1 / 64	-	1.70E-08	µg/m³	N/A	2.70E-03 c	µg/m³			NO	BSL

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Exposure Point	CAS Number	Chemical	Minimum Sediment Detection (mg/kg)	Maximum Sediment Detection (mg/kg)	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Units	Background Value [3]	Screening Toxicity Value [4]	Units	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	1031-07-8	ENDOSULFAN SULFATE	1.80E-03 J+	1.80E-03 J+	1.61E-08	1.61E-08	µg/m^3	WASD06	WASD06-005020	1 / 64	-	1.61E-08	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	72-20-8	ENDRIN	9.70E-04 J-	1.95E-03 J+	8.69E-09	1.75E-08	µg/m^3	WASD06	WASD06-005020	3 / 65	-	1.75E-08	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7421-93-4	ENDRIN ALDEHYDE	3.10E-03 J+	3.60E-03 J-	2.78E-08	3.23E-08	µg/m^3	WASD03	WASD03-005020	3 / 65	-	3.23E-08	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	53494-70-5	ENDRIN KETONE	2.00E-03 J-	1.09E-02 J+	1.79E-08	9.77E-08	µg/m^3	WASD06	WASD06-005020	3 / 65	-	9.77E-08	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	58-89-9	GAMMA-BHC (LINDANE)	2.00E-03 J	2.50E-03 J	1.79E-08	2.24E-08	µg/m^3	WDSD05	WDSD05-005020	2 / 64	-	2.24E-08	µg/m^3	N/A	4.00E-02 c	µg/m^3			NO	BSL
	76-44-8	HEPTACHLOR	6.70E-04 J+	1.20E-03 J-	3.66E-06	6.56E-06	µg/m^3	WASD03	WASD03-005020	3 / 65	-	6.56E-06	µg/m^3	N/A	9.40E-03 c	µg/m^3			NO	BSL
	72-43-5	METHOXYCHLOR	9.80E-03 J+	1.60E-02 J+	8.78E-08	1.43E-07	µg/m^3	WASD06	WASD06-005020	2 / 64	-	1.43E-07	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	12672-29-6	**AROCLOR-1248**	**5.60E+00 J+**	**5.60E+00 J+**	**2.35E-02**	**2.35E-02**	µg/m^3	**HSTP07**	**HSTP07-000005**	**1 / 66**	**-**	**2.35E-02**	µg/m^3	**N/A**	**2.10E-02 c**	µg/m^3			**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**2.40E-02 J**	**1.40E+01**	**7.47E-05**	**4.36E-02**	µg/m^3	**WDSD02**	**WDSD02-000005**	**8 / 65**	**-**	**4.36E-02**	µg/m^3	**N/A**	**2.10E-02 c**	µg/m^3			**YES**	**ASL**
	11096-82-5	**AROCLOR-1260**	**3.20E-02 J**	**1.60E+01 J+**	**6.40E-05**	**3.20E-02**	µg/m^3	**HSTP07**	**HSTP07-000005**	**14 / 66**	**-**	**3.20E-02**	µg/m^3	**N/A**	**2.10E-02 c**	µg/m^3			**YES**	**ASL**
	NA	TEQ for PCB Congeners [7] [10]	3.99E-07	1.17E-05	5.36E-10	1.58E-08	µg/m^3	WDSD03	WDSD03-000005	5 / 5	-	1.58E-08	µg/m^3	N/A	3.20E-07 c	µg/m^3			NO	BSL
	NA	High Risk PCBs [8]	3.86E-03	1.99E+00	1.90E-05	9.79E-03	µg/m^3	WASD04	WASD04-000005	5 / 5	-	9.79E-03	µg/m^3	N/A	2.10E-02 c	µg/m^3			NO	BSL
	NA	2,3,7,8-TCDD TEQ [9] [10]	2.92E-07	9.71E-05	3.92E-10	1.30E-07	µg/m^3	WDSD01	WDSD01-005020	21 / 21	-	1.30E-07	µg/m^3	N/A	3.20E-07 c	µg/m^3			NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	8.52E+02	2.74E+04 J	7.64E-03	2.46E-01	µg/m^3	WASD02	WASD02-000005	66 / 66	-	2.46E-01	µg/m^3	N/A	2.20E+00 n	µg/m^3			NO	BSL
	7440-36-0	ANTIMONY	6.40E-01 J	4.47E+02 J-	5.74E-06	4.01E-03	µg/m^3	MP04	MP04-000005	26 / 66	-	4.01E-03	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7440-38-2	ARSENIC	3.90E-01 J-	1.23E+02	3.50E-06	1.10E-03	µg/m^3	WDSD04	WDSD04-000005	65 / 65	-	1.10E-03	µg/m^3	N/A	2.90E-03 c	µg/m^3			NO	BSL
	7440-39-3	BARIUM	7.10E+00 J	5.98E+02	6.36E-05	5.36E-03	µg/m^3	WASD05	WASD05-005020	64 / 66	-	5.36E-03	µg/m^3	N/A	2.20E-01 n	µg/m^3			NO	BSL
	7440-41-7	BERYLLIUM	1.30E-01 J	5.60E+00	1.17E-06	5.02E-05	µg/m^3	WASD05	WASD05-005020	56 / 64	-	5.02E-05	µg/m^3	N/A	5.10E-03 c	µg/m^3			NO	BSL
	7440-43-9	CADMIUM	1.80E-01 J-	3.16E+01 J-	1.61E-06	2.83E-04	µg/m^3	MP04	MP04-000005	58 / 66	-	2.83E-04	µg/m^3	N/A	4.40E-03 n	µg/m^3			NO	BSL
	7440-70-2	CALCIUM METAL	5.35E+02 J-	1.74E+05	4.80E-03	1.56E+00	µg/m^3	WASD01	WASD01-000005	66 / 66	-	1.56E+00	µg/m^3	N/A	N/A	µg/m^3			NO	NUT
	7440-47-3	CHROMIUM[6]	9.60E+00 J	4.00E+04	8.60E-05	3.59E-01	µg/m^3	WDSD04	WDSD04-000005	66 / 66	-	3.59E-01	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7440-47-3	**CHROMIUM[6]**	**9.60E+00 J**	**4.00E+04**	**8.60E-05**	**3.59E-01**	µg/m^3	**WDSD04**	**WDSD04-000005**	**66 / 66**	**-**	**3.59E-01**	µg/m^3	**N/A**	**1.50E-04 c**	µg/m^3			**YES**	**ASL**
	18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**1.25E+00 J**	**4.45E+01**	**1.12E-05**	**3.99E-04**	µg/m^3	**MP04**	**MP04-000005**	**6 / 24**	**-**	**3.99E-04**	µg/m^3	**N/A**	**1.50E-04 c**	µg/m^3			**YES**	**ASL**
	7440-48-4	**COBALT**	**1.70E+00 J**	**3.44E+04 J-**	**1.52E-05**	**3.08E-01**	µg/m^3	**MP04**	**MP04-000005**	**66 / 66**	**-**	**3.08E-01**	µg/m^3	**N/A**	**1.40E-03 c**	µg/m^3			**YES**	**ASL**
	7440-50-8	COPPER	9.00E+00	5.58E+03	8.07E-05	5.00E-02	µg/m^3	WDSD01	WDSD01-000005	66 / 66	-	5.00E-02	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	57-12-5	CYANIDE	3.30E-01 J	1.70E+00 J-	2.96E-06	1.52E-05	µg/m^3	MP04	MP04-000005	5 / 62	-	1.52E-05	µg/m^3	N/A	3.50E-01 n	µg/m^3			NO	BSL
	7439-89-6	IRON	3.68E+03	2.91E+05 J-	3.30E-02	2.61E+00	µg/m^3	MP04	MP04-000005	66 / 66	-	2.61E+00	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7439-92-1	LEAD	1.92E+01 J	3.60E+03	1.72E-04	3.23E-02	µg/m^3	WASD08	WASD08-000005	66 / 66	-	3.23E-02	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7439-95-4	MAGNESIUM	1.40E+02 J	7.82E+03	1.25E-03	7.01E-02	µg/m^3	PCWLSD02	PCWLSD02-000005	65 / 66	-	7.01E-02	µg/m^3	N/A	N/A	µg/m^3			NO	NUT
	7439-96-5	MANGANESE	1.46E+01	1.78E+03 J-	1.31E-04	1.60E-02	µg/m^3	MP04	MP04-000005	66 / 66	-	1.60E-02	µg/m^3	N/A	2.20E-02 n	µg/m^3			NO	BSL
	7439-97-6	**MERCURY**	**5.00E-02 J**	**1.00E+02**	**2.53E-02**	**5.05E+01**	µg/m^3	**WDSD03**	**WDSD03-000005**	**66 / 66**	**-**	**5.05E+01**	µg/m^3	**N/A**	**1.30E-01 n**	µg/m^3			**YES**	**ASL**
	7440-02-0	**NICKEL**	**1.25E+01**	**5.67E+04 J-**	**1.12E-04**	**5.08E-01**	µg/m^3	**MP04**	**MP04-000005**	**66 / 66**	**-**	**5.08E-01**	µg/m^3	**N/A**	**3.90E-02 n**	µg/m^3			**YES**	**ASL**
	7440-09-7	POTASSIUM	4.67E+02	5.71E+03	4.19E-03	5.12E-02	µg/m^3	PCWLSD02	PCWLSD02-000005	58 / 66	-	5.12E-02	µg/m^3	N/A	N/A	µg/m^3			NO	NUT
	7782-49-2	SELENIUM	1.10E+00 J+	1.03E+01 J+	9.86E-06	9.23E-05	µg/m^3	WASD01	WASD01-000005	12 / 64	-	9.23E-05	µg/m^3	N/A	8.80E+00 n	µg/m^3			NO	BSL
	7440-22-4	SILVER	4.10E-01 J	7.88E+01 J-	3.67E-06	7.06E-04	µg/m^3	WDSD01	WDSD01-000005	51 / 65	-	7.06E-04	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7440-23-5	SODIUM	7.37E+02	1.46E+04	6.61E-03	1.31E-01	µg/m^3	WDSD04	WDSD04-000005	59 / 66	-	1.31E-01	µg/m^3	N/A	N/A	µg/m^3			NO	NUT
	7440-28-0	THALLIUM	2.80E-01 J	6.31E+01 J-	2.51E-06	5.66E-04	µg/m^3	MP04	MP04-000005	36 / 65	-	5.66E-04	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	7440-62-2	VANADIUM (FUME OR DUST)	1.80E+00 J	1.55E+02	1.61E-05	1.39E-03	µg/m^3	WDSD04	WDSD04-000005	66 / 66	-	1.39E-03	µg/m^3	N/A	4.40E-02 n	µg/m^3			NO	BSL
	7440-66-6	ZINC	3.45E+01 J	2.20E+03 J-	3.09E-04	1.97E-02	µg/m^3	MP04	MP04-000005	66 / 66	-	1.97E-02	µg/m^3	N/A	N/A	µg/m^3			NO	NTX
	14913-49-6	BISMUTH-212	5.91E-01 J	1.42E+00 J	5.30E-06	1.27E-05	pCi/m^3	PCWLSD04	PCWLSD04-005020	36 / 36	-	1.27E-05	pCi/m^3	N/A	5.45E-02 c	pCi/m^3			NO	BSL
	14733-03-0	BISMUTH-214	3.73E-01 J	1.18E+00 J	3.34E-06	1.06E-05	pCi/m^3	PCWLSD08	PCWLSD08-005020	36 / 36	-	1.06E-05	pCi/m^3	N/A	2.01E-04 c	pCi/m^3			NO	BSL
	10045-97-3	CESIUM-137	1.90E-02	3.76E-01	1.70E-07	3.37E-06	pCi/m^3	PCWLSD02	PCWLSD02-000005	27 / 27	-	3.37E-06	pCi/m^3	N/A	5.50E-02 c	pCi/m^3			NO	BSL

Table 2.7
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Exposure Point	CAS Number	Chemical	Minimum Sediment Detection (mg/kg)		Maximum Sediment Detection (mg/kg)		Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Units	Background Value [3]	Screening Toxicity Value [4]		Units	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	15092-94-1	LEAD-212	4.62E-01	J	1.24E+00	J	4.14E-06	1.11E-05	pCi/m^3	PCWLSD06	PCWLSD06-005020	36 / 36	-	1.11E-05	pCi/m^3	N/A	8.36E-03	c	pCi/m^3			NO	BSL
	15067-28-4	LEAD-214	4.23E-01	J	1.40E+00	J	3.79E-06	1.25E-05	pCi/m^3	PCWLSD08	PCWLSD08-005020	36 / 36	-	1.25E-05	pCi/m^3	N/A	2.01E-04	c	pCi/m^3			NO	BSL
	13966-00-2	POTASSIUM-40	4.85E+00		1.86E+01		4.35E-05	1.67E-04	pCi/m^3	PCWLSD11	PCWLSD11-000005	36 / 36	-	1.67E-04	pCi/m^3	N/A	2.80E-02	c	pCi/m^3			NO	BSL
	13982-63-3	RADIUM-226	3.00E-01	J	2.77E+00	J	2.69E-06	2.48E-05	pCi/m^3	WASD05	WASD05-005020	16 / 26	-	2.48E-05	pCi/m^3	N/A	1.05E-04	c	pCi/m^3			NO	BSL
	15262-20-1	RADIUM-228	2.82E-01	J	1.99E+00	J	2.53E-06	1.78E-05	pCi/m^3	WASD05	WASD05-005020	53 / 62	-	1.78E-05	pCi/m^3	N/A	3.30E-05	c	pCi/m^3			NO	BSL
	10098-97-2	STRONTIUM-90	4.10E-01	J	4.10E-01	J	3.67E-06	3.67E-06	pCi/m^3	WASD08	WASD08-000005	1 / 59	-	3.67E-06	pCi/m^3	N/A	1.43E-02	c	pCi/m^3			NO	BSL
	14913-50-9	THALLIUM-208	1.56E-01	J	3.86E-01	J	1.40E-06	3.46E-06	pCi/m^3	PCWLSD06	PCWLSD06-005020	36 / 36	-	3.46E-06	pCi/m^3	N/A	2.53E+00	c	pCi/m^3			NO	BSL
	15117-96-1	URANIUM-235	6.18E-02	J	1.70E-01	J	5.54E-07	1.52E-06	pCi/m^3	PCWLSD14	PCWLSD14-005020	7 / 16	-	1.52E-06	pCi/m^3	N/A	1.98E-05	c	pCi/m^3			NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for industrial air (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for xylenes used for m,p-xylene.
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene
RSL value for Aroclor-1260 used for Aroclor-1268
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 1 km^2 with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Values (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
µg/m3 = micrograms per cubic meter
N/A = Not available
pCi/m^3 = picocuries per cubic meter

[6] Given the distribution of samples speciated for hexavalent chromium, total chromium results were screened against trivalent and hexavalent chromium RSLs.
[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.
[10] Air concentration calculated using the VF for 2,3,7,8-TCDD.

Air concentration = soil concentration x (1/PEF + 1/VF)
PEF = particulate emission factor; VF = volatilization factor
PEF for construction worker = 1.1 x 10^8 m^3/kg (Calculated using equations 5-5 and 5-6 from EPA, 2002, see Table 2.7a).
VF calculcated in Table 2.7b using equations from EPA, 2002.
PEF and VF calculations based on assumed maximum area of exposed trench that would be open at a given time during a utility worker project, estimated to be 100 linear feet of a 16 feet wide trench.

Table 2.7a
Calculation of Construction Worker Exposure Scenario PEF

Construction Scenario PEF (m^3/kg) (Lowest of Excavation Activities and Wind PEF and Contribution from Traffic on Unpaved Road PEF) =	1.12E+08

Traffic on Unpaved Road PEF

$$PEF_{SC} = {}^{Q}/_{C_{Sr}} \times \frac{1}{F_D} \times \frac{T \times A_R}{556 \times \left({}^{W}/_{3}\right)^{0.4} \times \left(\frac{365\ d/yr - p}{365\ d/yr}\right) \times \sum VKT}$$

Equation 5-5 from EPA, 2002

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

Equation 5-6 from EPA, 2002

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

Equation E-16 from Appendix E of EPA, 2002

Variable	Value	Units	Definition	Source
A	12.9	unitless	Constant	Default
B	5.74	unitless	Constant	Default
C	71.8	unitless	Constant	Default
T	31,500,000	seconds	Total time over which construction occurs	Assumed
AR	74	m2	Surface area of contaminated road segment	Calculated, site-specific (square root of site surface contamination configured as a square x default width of road segment of 20 ft)
s	8.50	%	Road surface silt content	Default
W	11	tons	Mean weight of vehicle	Assumed (5 x 2-ton and 5 x 20-ton trucks per day)
Mdry	0.2	%	Road surface material moisture content under dry, uncontrolled conditions	Default
p	120	days	Number of days with at least 0.01 inches of precipitation	Lookup value (Exhibit 5-2 from EPA, 2002)
# days/truck	260	days		Assumed (5 days per week for 52 weeks)
SVKT	63	km	Sum of fleet vehicle kilometers traveled during the exposure duration	Assumed (3 vehicles x 0.045 km/day x 250 days)
LR	40	feet	Road length	Assumed (square root of the area)
WR	20	feet	Road width	Assumed
As	0.0367	acres	Areal extent of site (or site contamination)	Site-specific
tc	8,760	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.186	unitless	Dispersion correction factor	Calculated (Equation E-16 from Appendix E of EPA, 2002)
Q/Csr	40.4	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	Calculated (Equation 5-6 from EPA, 2002)
PEF		m3/kg	Subchronic road particular emission factor	Calculated

Table 2.7a
Calculation of Construction Worker Exposure Scenario PEF

Excavation Activities and Wind PEF

Site Assumptions

Variable	Value	Units	Source
Site Area	0.0367	acres	Site-specific
Site Area	1,599	square feet	Calculated, site-specific
Site Area	149	square meters	Calculated, site-specific
Site length	40	feet, assumed to be a square	Calculated, site-specific
# passes	6	# passes to cover entire site	Calculated, site-specific

Wind Erosion (Equation E-20 from Appendix E of EPA, 2002)

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760\ hr/yr$$

Variable	Value	Units	Definition	Source
V	0	unitless	Fraction of vegetative cover	Default
Um	4.69	m/s	Mean annual windspeed	Default
Ut	11.3	m/s	Equivalent threshold value of windspeed at 7m	Default
F(x)	0.194	unitless	Fuction dependent on Um/Ut derived	Default
Asurf	149	m2	Areal extent of site with undisturbed surface soil contamination	Site-specific, calculated
ED	0.054794521	year	Exposure duration	Assumed (20-day duration)
Mwind	35	g	Unit mass emitted from wind erosion	Calculated

Table 2.7a
Calculation of Construction Worker Exposure Scenario PEF

Excavation Emissions (Equation E-21 from Appendix E of EPA, 2002)

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times A_{excav} \times D_{excav} \times N_A \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
Um	4.69	m/s	Mean windspeed during construction	Default
M	12	%	Gravimetric soil moisture content	Default
Psoil	1.68	Mg/m3	In-situ soil density	Default
Aexcav	149	m2	Areal extent of excavation	Assumed (all of the trench area is graded)
dexcav	3.03030303	m	Average depth of excavation	Assumed (10-foot excavation)
NA	2	unitless	Number of times soil is dumped	Default
Mexcav	184.4943507	g	Unit mass emitted from excavation	Calculated

Dozing Emissions (Equation E-22 from Appendix E of EPA, 2002)

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
s	6.9	%	Soil silt content	Default
M	7.9	%	Gravimetric soil moisture content	Default
SVKT	0.15	km	Sum of dozing kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
S	11.4	kph	Average dozing speed	Default
Mdoz	4.346593279	g	Unit mass emitted from dozing operations	Calculated

Grading Emissions (Equation E-23 from Appendix E of EPA, 2002)

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
S	11.4	kph	Average grading speed	Default
SVKT	0.15	km	Sum of grading kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
Mgrade	63.87535842	g	Unit mass emitted from grading operations	Calculated

Table 2.7a
Calculation of Construction Worker Exposure Scenario PEF

Tilling Emissions (Equation E-24 from Appendix E of EPA, 2002)

$$M_{till} = 1.1(s)^{0.6} \times A_{till} \times 4{,}047\, m^2/acre \times 10^{-4}\, ha/m^2 \times 10^3 g/kg \times N_A$$

Variable	Value	Units	Definition	Source
s	18	%	Soil silt content	Default
Atill	0.01835	acre	Areal extent of tilling	Calculated (assume one-half the site is tilled for re-vegetation)
NA	2	unitless	Number of times soil is tilled	Default
Mtill	0	g	Unit mass emitted from tilling or similar operations	Assumed no tilling takes place for trenching

<J'T> - unit emission flux (Equation E-25 from Appendix E of EPA, 2002)

$$< J_T^{..} >= \frac{M_{wind} + M_{ecav} + M_{doz} + M_{grade} + M_{till}}{A_c \times T}$$

Variable	Value	Units	Definition	Source
Ac	148.595702	m2	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
T	1728000	s	Duration of construction	Assumed (20-day duration)
<J'T>	1.12217E-06	g/m2-s	Total time-averaged unit emission flux for construction activities other than traffic on unpaved road	

PEF'sc (Equation E-26 from Appendix E of EPA, 2002)

$$PEF_{sc}^{..} = Q/C_{sa} \times \frac{1}{F_D} \times \frac{1}{< J_T^{..} >}$$

Variable	Value	Units	Definition	Source
Ac	0.0367	acres	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration and the emission flux at the center of the square emission source	Calculated (equation E-15 from Appendix E of EPA, 2002)
tc	480	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.196311737	unitless	Dispersion correction factor	Calculated (equation E-16 from Appendix E of EPA, 2002)
PEF'sc	1.12E+08	m3/kg	Subchronic particulate emission factor for construction activities other than traffic on unpaved roads	

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

Table 2.7b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario

Chemical		Diffusivity in Air (Di) (cm2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (Dw) (cm2/s)	Soil Organic Carbon Partition Coeff. (Koc) (cm3/g)	Soil Water Partition Coeff. (Kd = Koc x Foc) (g/cm3)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (DA) (cm2/s)	Volatilization Factor (VF) (m3/kg)
Volatile Organics									
2-Butanone (Methyl ethyl ketone)	78-93-3	9.14E-02	2.33E-03	1.02E-05	4.51E+00	2.71E-02	2.23E+05	8.94E-05	4.66E+03
Acetone	67-64-1	1.06E-01	1.43E-03	1.15E-05	2.36E+00	1.42E-02	1.00E+06	7.1E-05	5.2E+03
Carbon Disulfide	75-15-0	1.06E-01	5.89E-01	1.30E-05	2.17E+01	1.30E-01	2.16E+03	9.8E-03	4.5E+02
Methylene chloride	75-09-2	1.0E-01	1.3E-01	1.3E-05	2.2E+01	1.30E-01	1.3E+04	2.8E-03	8.4E+02
2-Methylnaphthalene	91-57-6	5.2E-02	2.1E-02	7.8E-06	2.5E+03	1.49E+01	2.5E+01	4.0E-06	2.2E+04
Acenaphthene	83-32-9	5.1E-02	7.5E-03	8.3E-06	5.0E+03	3.02E+01	3.9E+00	6.7E-07	5.4E+04
Acetophenone	98-86-2	6.5E-02	4.3E-04	8.7E-06	5.2E+01	3.11E-01	6.1E+03	3.7E-06	2.3E+04
Anthracene	120-12-7	3.9E-02	2.3E-03	7.9E-06	1.6E+04	9.82E+01	4.3E-02	4.9E-08	2.0E+05
Benzo(a)anthracene	56-55-3	2.61E-02	4.91E-04	6.75E-06	1.77E+05	1.06E+03	9.40E-03	6.8E-10	1.7E+06
Biphenyl	92-52-4	4.70E-02	1.26E-02	7.60E-06	5.10E+03	3.06E+01	4.00E+00	1.0E-06	1.5E+04
Dibenzofuran	132-64-9	6.51E-02	8.71E-03	7.38E-06	9.16E+03	5.50E+01	3.10E+00	5.5E-07	5.9E+04
Fluorene	86-73-7	4.4E-02	3.9E-03	7.9E-06	9.2E+03	5.50E+01	1.7E+00	1.7E-07	1.1E+05
Naphthalene	91-20-3	6.0E-02	1.8E-02	8.4E-06	1.5E+03	9.26E+00	3.1E+01	6.2E-06	1.8E+04
Pyrene	129-00-0	2.8E-02	4.9E-04	7.2E-06	5.4E+04	3.26E+02	1.4E-01	2.3E-09	9.1E+05
4,4'-DDE	72-55-9	2.3E-02	1.7E-03	5.9E-06	1.2E+05	7.05E+02	4.0E-02	3.0E-09	8.0E+05
Aldrin	309-00-2	2.3E-02	1.8E-03	5.8E-06	8.2E+04	4.92E+02	1.7E-02	4.5E-09	6.6E+05
Chlordane	12789-03-6	2.1E-02	2.0E-03	5.4E-06	6.8E+04	4.05E+02	5.6E-02	5.7E-09	5.8E+05
Heptachlor	76-44-8	2.2E-02	1.2E-02	5.7E-06	4.1E+04	2.48E+02	1.8E-01	5.8E-08	1.8E+05
Aroclor-1248	12672-29-6	1.63E-02	1.80E-02	3.94E-06	7.65E+04	4.59E+02	1.00E-01	3.4E-08	2.4E+05
Aroclor-1254	11097-69-1	2.37E-02	1.16E-02	6.10E-06	1.31E+05	7.83E+02	4.30E-02	1.9E-08	3.2E+05
Aroclor-1260	11096-82-5	2.20E-02	1.37E-02	5.61E-06	3.50E+05	2.10E+03	1.44E-02	7.7E-09	5.0E+05
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	4.24E-02	2.07E-03	5.69E-06	3.50E+05	2.10E+03	7.53E-04	2.3E-09	9.3E+05
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	4.67E-02	1.16E-02	6.06E-06	1.31E+05	7.83E+02	3.40E-03	3.7E-08	2.3E+05
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	4.44E-02	2.80E-03	5.86E-06	2.09E+05	1.26E+03	2.23E-03	5.3E-09	6.0E+05
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	4.67E-02	3.78E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	1.2E-08	4.0E+05
2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	4.67E-02	7.77E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	2.5E-08	2.8E+05
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	4.67E-02	1.18E-02	6.06E-06	1.28E+05	7.67E+02	1.34E-02	3.8E-08	2.3E+05
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	4.67E-02	7.77E-03	6.06E-06	1.28E+05	7.67E+02	7.33E-03	2.5E-08	2.8E+05
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	4.94E-02	9.12E-03	6.27E-06	7.81E+04	4.69E+02	3.22E-02	5.1E-08	1.9E+05
2,3,7,8-TCDD	1746-01-6	4.70E-02	2.04E-03	6.76E-06	2.49E+05	1.49E+03	2.00E-04	3.5E-09	7.5E+05
Polychlorinated Biphenyls (high risk)	NA	2.43E-02	1.70E-02	6.27E-06	7.81E+04	4.69E+02	7.00E-01	4.7E-08	2.0E+05
Mercury	7439-97-6	3.10E-02	3.50E-01	6.30E-06	NA	1.00E+00	6.00E-02	5.0E-04	2.0E+03

Volatilization factor (VF) (m^3/kg)
Equation 5-14 of EPA, 2002

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4}\, m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Apparent Diffusivity (DA) (cm^2/s)
Equation 5-14 of EPA, 2002

$$D_A = \frac{\left[\left(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w\right)/n^2\right]}{\rho_b K_d + \theta_w + \theta_a H'}$$

Variable	Value	Unit	Definition	Source
Q/C =	132.8562746	g/m^2-s per kg/m^3	Q/Csa * (1/Fd)	Intermediate calculation
Fd	0.185	unitless	Dispersion correction factor	Default
Qa	0.28	Lair/Lwater	Air-filled soil porosity	n - Qw (Equation 5-14 of EPA, 2002)
n	0.43	Lpore/Lsoil	Total soil porosity	1 - (rb/rs) (Equation 5-14 of EPA, 2002)
Qw	0.15	Lwater/Lsoil	Water-filled soil porosity	Default
rs	2.65	g/cm^3	Soil particle density	Default
rb	1.5	g/cm^3	Dry soil bulk density	Default
T	3.154E+07	seconds	Total time over which construction occurs	Calculated (1-year duration)
foc	0.006	g/g	Fraction organic carbon in soil	Default
A	2.4538	unitless	Constant	Default
Ac	0.0367	acres	Areal extent of soil contamination	Site-specific
B	17.566	unitless	Constant	Default
C	189.0426	unitless	Constant	Default
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the volatilzation flux at the center of a square site	Calculated (Equation 5-15 of EPA, 2002)

Chemical and physical properties from parameter table for Regional Screening Levels, June 2017.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.

Table 2.8
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening Toxicity Value			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [7] Contaminant Deletion or Selection	
Estuarine Wetland																			
	84-74-2	DI-N-BUTYL PHTHALATE	2.70E+00 J	2.70E+00 J	ug/L	WASW06	WASW06	1 / 7	5.00E+00 - 5.00E+00	2.70E+00	N/A	9.00E+02	n	[4]	N/A		NO	BSL	
	NA	**TEQ for PCB Congeners [8]**	**2.65E-08**	**4.83E-06**	**ug/L**	**WDSW03**	**WDSW03**	**4 / 4**	**N/A**	**4.83E-06**	**N/A**	**5.00E-08**		**[6]**	**N/A**		**YES**	**ASL**	
	NA	**High Risk PCBs [9]**	**7.96E-03**	**2.35E-01**	**ug/L**	**WDSW03**	**WDSW03**	**4 / 4**	**N/A**	**2.35E-01**	**N/A**	**N/A**			**N/A**		**YES**	**TOX**	**[10]**
	NA	**2,3,7,8-TCDD TEQ [11]**	**1.01E-07**	**1.20E-06**	**ug/L**	**WDSW05**	**WDSW05**	**4 / 4**	**N/A**	**1.20E-06**	**N/A**	**5.00E-08**		**[6]**	**N/A**		**YES**	**ASL**	
	7429-90-5	ALUMINUM (FUME OR DUST)	2.35E+02	4.27E+02	ug/L	WDSW05	WDSW05	7 / 7	N/A	4.27E+02	N/A	2.00E+04	n	[4]	N/A		NO	BSL	
	7440-36-0	ANTIMONY	2.40E+00	3.20E+00	ug/L	WDSW02	WDSW02	3 / 7	2.00E+00 - 2.00E+00	3.20E+00	N/A	5.60E+00		[6]	N/A		NO	BSL	
	7440-38-2	**ARSENIC**	**1.60E+00**	**5.90E+00**	**J**	**ug/L**	**WDSW04**	**7 / 7**	**N/A**	**5.90E+00**	**N/A**	**5.20E-01**	**c**	**[4]**	**N/A**		**YES**	**ASL**	
	7440-39-3	BARIUM	3.40E+01 J	6.43E+01 J	ug/L	WDSW02	WDSW02	7 / 7	N/A	6.43E+01	N/A	2.00E+03		[6]	N/A		NO	BSL	
	7440-43-9	CADMIUM	4.65E-01 J	1.10E+00	ug/L	WDSW02	WDSW02	4 / 7	1.00E+00 - 1.00E+00	1.10E+00	N/A	5.00E+00		[6]	N/A		NO	BSL	
	7440-70-2	CALCIUM METAL	3.27E+04	1.71E+05	ug/L	WASW09	WASW09	7 / 7	N/A	1.71E+05	N/A	N/A			N/A		NO	NUT	
	7440-47-3	**CHROMIUM[5]**	**2.00E+00 J**	**1.36E+02 J**		**ug/L**	**WDSW03**	**WDSW03**	**6 / 7**	**2.00E+00 - 2.00E+00**	**1.36E+02**	**N/A**	**3.50E-01**	**c**	**[5]**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**1.11E+00 J**	**2.61E+02**		**ug/L**	**WDSW03**	**WDSW03**	**7 / 7**	**N/A**	**2.61E+02**	**N/A**	**6.00E+00**	**n**	**[4]**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	7.00E+00	7.22E+01	ug/L	WDSW02	WDSW02	7 / 7	N/A	7.22E+01	N/A	8.00E+02	n	[4]	N/A		NO	BSL	
	57-12-5	**CYANIDE**	**2.10E+00 J**	**3.60E+00 J**		**ug/L**	**WDSW05**	**WDSW05**	**2 / 7**	**1.00E+01 - 1.00E+01**	**3.60E+00**	**N/A**	**1.50E+00**	**n**	**[4]**	**N/A**		**YES**	**ASL**
	7439-89-6	**IRON**	**3.03E+02**	**9.30E+02**		**ug/L**	**WDSW05**	**WDSW05**	**7 / 7**	**N/A**	**9.30E+02**	**N/A**	**3.00E+02**		**[6]**	**N/A**		**YES**	**ASL**
	7439-92-1	LEAD	2.80E+00 J	6.80E+00 J	ug/L	WDSW05	WDSW05	7 / 7	N/A	6.80E+00	N/A	1.50E+01		[6]	N/A		NO	BSL	
	7439-95-4	MAGNESIUM	3.33E+03	4.77E+05	ug/L	WASW09	WASW09	7 / 7	N/A	4.77E+05	N/A	N/A			N/A		NO	NUT	
	7439-96-5	MANGANESE	9.20E+00 J	4.90E+01	ug/L	WDSW05	WDSW05	7 / 7	N/A	4.90E+01	N/A	4.30E+02	n	[4]	N/A		NO	BSL	
	7440-02-0	NICKEL	3.90E+00	1.73E+02	ug/L	WDSW03	WDSW03	7 / 7	N/A	1.73E+02	N/A	3.90E+02	n	[4]	N/A		NO	BSL	
	7440-09-7	POTASSIUM	6.33E+03	1.74E+05	ug/L	WASW09	WASW09	7 / 7	N/A	1.74E+05	N/A	N/A			N/A		NO	NUT	
	7782-49-2	SELENIUM	7.75E+00	3.19E+01	ug/L	WASW09	WASW09	5 / 7	5.00E+00 - 5.00E+00	3.19E+01	N/A	1.00E+02	n	[4]	N/A		NO	BSL	
	7440-23-5	SODIUM	9.85E+03	4.08E+06	ug/L	WASW09	WASW09	7 / 7	N/A	4.08E+06	N/A	N/A			N/A		NO	NUT	
	7440-28-0	**THALLIUM**	**2.10E+00 J**	**2.30E+00 J**		**ug/L**	**WASW09**	**WASW09**	**2 / 7**	**1.00E+00 - 1.00E+00**	**2.30E+00**	**N/A**	**2.00E-01**	**n**	**[4]**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	1.40E+00 J	3.50E+00 J	ug/L	WDSW05	WDSW05	7 / 7	N/A	3.50E+00	N/A	8.60E+01	n	[4]	N/A		NO	BSL	
	7440-66-6	ZINC	2.85E+01	1.18E+02	ug/L	WDSW02	WDSW02	7 / 7	N/A	1.18E+02	N/A	6.00E+03	n	[4]	N/A		NO	BSL	
	13982-63-3	**RADIUM-226**	**5.10E+01**	**5.10E+01**		**pCi/L**	**WDSW05**	**WDSW05**	**1 / 7**	**1.87E+01 - 5.24E+01**	**5.10E+01**	**N/A**	**4.30E-03**		**[4]**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Levels (RSLs) for tapwater (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0)
[5] Chromium concentrations screened against hexavalent chromium 10x EPA tap water RSL.
[6] Code of Virginia, Water Quality Standards; Public Water Supply (9AVAC25-260-140).
[7] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
ug/L = micrograms per liter
N/A = Not available
pCi/L = picocuries per liter

[8] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[9] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[10] Identified as a COPC based on available toxicological data.
[11] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

Table 2.9
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Northern Drainage Channel																
	120-12-7	ANTHRACENE	5.90E-01 J	5.90E-01 J	mg/kg	NASD01	NASD01-000005	1 / 2	6.80E-01 - 6.80E-01	5.90E-01	N/A	1.80E+04 n	N/A		NO	BSL
	56-55-3	BENZO[A]ANTHRACENE	1.60E+00 J	2.60E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	2.60E+00	N/A	1.10E+01 c	N/A		NO	BSL
	50-32-8	**BENZO[A]PYRENE**	**1.70E+00 J**	**3.40E+00 J**	**mg/kg**	**NASD01**	**NASD01-000005**	**2 / 2**	**N/A**	**3.40E+00**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	205-99-2	BENZO[B]FLUORANTHENE	2.60E+00 J	5.20E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	5.20E+00	N/A	1.10E+01 c	N/A		NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	1.30E+00 J	1.90E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	1.90E+00	N/A	1.80E+03 n	N/A		NO	BSL
	207-08-9	BENZO[K]FLUORANTHENE	1.60E+00 J	3.10E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	3.10E+00	N/A	1.10E+02 c	N/A		NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.60E+00 J	2.55E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	2.55E+00	N/A	3.90E+02 c	N/A		NO	BSL
	218-01-9	CHRYSENE	2.00E+00 J	3.20E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	3.20E+00	N/A	1.10E+03 c	N/A		NO	BSL
	53-70-3	DIBENZ[A,H]ANTHRACENE	5.70E-01 J	8.70E-01 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	8.70E-01	N/A	1.10E+00 c	N/A		NO	BSL
	206-44-0	FLUORANTHENE	2.80E+00 J	4.60E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	4.60E+00	N/A	2.40E+03 n	N/A		NO	BSL
	193-39-5	INDENO(1,2,3-CD)PYRENE	1.20E+00 J	2.20E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	2.20E+00	N/A	1.10E+01 c	N/A		NO	BSL
	85-01-8	PHENANTHRENE	1.10E+00 J	2.10E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	2.10E+00	N/A	1.80E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	2.80E+00 J	4.90E+00 J	mg/kg	NASD01	NASD01-000005	2 / 2	N/A	4.90E+00	N/A	1.80E+03 n	N/A		NO	BSL
	11097-69-1	AROCLOR-1254	6.90E-01 J	8.80E-01 J	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	8.80E-01	N/A	1.20E+00 n	N/A		NO	BSL
	11096-82-5	AROCLOR-1260	7.30E-01 J	1.00E+00 J	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.00E+00	N/A	2.40E+00 c	N/A		NO	BSL
	NA	**2,3,7,8-TCDD TEQ [7]**	**4.50E-05**	**2.86E-04**	**mg/kg**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**2.86E-04**	**N/A**	**4.80E-05 c**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	8.78E+03	1.49E+04	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.49E+04	N/A	7.70E+04 n	N/A		NO	BSL
	7440-36-0	ANTIMONY	3.55E+00 J	4.80E+00 J	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	4.80E+00	N/A	3.10E+01 n	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**1.70E+01**	**3.00E+01**	**mg/kg**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**3.00E+01**	**N/A**	**6.80E+00 c**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	1.52E+02	2.93E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	2.93E+02	N/A	1.50E+04 n	N/A		NO	BSL
	7440-41-7	BERYLLIUM	5.15E-01	8.80E-01	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	8.80E-01	N/A	1.60E+02 n	N/A		NO	BSL
	7440-43-9	CADMIUM	5.15E+00	9.50E+00	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	9.50E+00	N/A	7.10E+01 n	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	7.81E+03	1.45E+04	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.45E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	3.79E+01	5.43E+01	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	5.43E+01	N/A	1.20E+05 n	N/A		NO	BSL
	7440-47-3	**CHROMIUM[6]**	**3.79E+01**	**5.43E+01**	**mg/kg**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**5.43E+01**	**N/A**	**3.00E+00 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**2.38E+01**	**5.25E+01**	**mg/kg**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**5.25E+01**	**N/A**	**2.30E+01 n**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	1.64E+02	2.24E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	2.24E+02	N/A	3.10E+03 n	N/A		NO	BSL
	57-12-5	CYANIDE	1.42E+01	1.51E+01	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.51E+01	N/A	2.30E+01 n	N/A		NO	BSL
	7439-89-6	IRON	2.57E+04	5.02E+04	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	5.02E+04	N/A	5.50E+04 n	N/A		NO	BSL
	7439-92-1	LEAD	2.34E+02	4.29E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	4.29E+02	N/A	2.00E+03	N/A		NO	BSL
	7439-95-4	MAGNESIUM	2.33E+03	4.05E+03	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	4.05E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	2.77E+02	3.95E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	3.95E+02	N/A	1.80E+03 n	N/A		NO	BSL
	7439-97-6	MERCURY	1.01E+00	1.30E+00	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.30E+00	N/A	7.80E+00 n	N/A		NO	BSL
	7440-02-0	NICKEL	6.00E+01	1.16E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.16E+02	N/A	1.50E+03 n	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.56E+03	2.63E+03	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	2.63E+03	N/A	N/A	N/A		NO	NUT
	7782-49-2	SELENIUM	2.15E+00 J+	3.10E+00 J+	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	3.10E+00	N/A	3.90E+02 n	N/A		NO	BSL
	7440-22-4	SILVER	1.25E+00	1.90E+00	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.90E+00	N/A	3.90E+02 n	N/A		NO	BSL
	7440-23-5	SODIUM	2.35E+02 J	4.67E+02	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	4.67E+02	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**2.80E+00**	**5.50E+00**	**mg/kg**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**5.50E+00**	**N/A**	**7.80E-01 n**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	3.70E+01	5.79E+01	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	5.79E+01	N/A	3.90E+02 n	N/A		NO	BSL

Table 2.9
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-66-6	ZINC	7.36E+02 J	1.16E+03 J	mg/kg	NASD02	NASD02-000005	2 / 2	N/A	1.16E+03	N/A	2.30E+04 n	N/A		NO	BSL
	13982-63-3	**RADIUM-226**	**4.51E-01 J**	**6.12E-01 J**	**pCi/g**	**NASD01**	**NASD01-000005**	**2 / 2**	**N/A**	**6.12E-01**	**N/A**	**1.79E-01 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**5.43E-01 J**	**5.72E-01 J**	**pCi/g**	**NASD01**	**NASD01-000005**	**2 / 2**	**N/A**	**5.72E-01**	**N/A**	**1.40E-01 c**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Level (RSL) for residential soil (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0)

RSL value for methyl mercury used for mercury

Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 50 ft with no cover and cancer risk = 1E-05. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/prg_search

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: Below Screening Level (BSL)

No Screening Value (NTX)

Essential Nutrient (NUT)

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

c = Carcinogenic

n = Noncarcinogenic

J = Estimated Value

mg/kg = milligrams per kilogram

N/A = Not available

pCi/g = picocuries per gram

[6] Chromium concentrations screened against both trivalent and hexavalent chromium RSLs.

[7] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

Table 2.10
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Units	Background [3] Value	Screening [4] Toxicity Value		Units	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Northern Drainage Channel	120-12-7	ANTHRACENE	5.90E-01 J	5.90E-01 J	2.95E-03	2.95E-03	µg/m^3	NASD01	NASD01-000005	1 / 2	6.80E-01 - 6.80E-01	2.95E-03	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	56-55-3	BENZO[A]ANTHRACENE	1.60E+00 J	2.60E+00 J	9.63E-04	1.57E-03	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	1.57E-03	µg/m^3	N/A	2.00E-01	c	µg/m^3			NO	BSL
	50-32-8	BENZO[A]PYRENE	1.70E+00 J	3.40E+00 J	1.52E-05	3.05E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	3.05E-05	µg/m^3	N/A	8.80E-04	n	µg/m^3			NO	BSL
	205-99-2	BENZO[B]FLUORANTHENE	2.60E+00 J	5.20E+00 J	2.33E-05	4.66E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	4.66E-05	µg/m^3	N/A	2.00E-01	c	µg/m^3			NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	1.30E+00 J	1.90E+00 J	1.17E-05	1.70E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	1.70E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	207-08-9	BENZO[K]FLUORANTHENE	1.60E+00 J	3.10E+00 J	1.43E-05	2.78E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	2.78E-05	µg/m^3	N/A	2.00E+00	c	µg/m^3			NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.60E+00 J	2.55E+00 J	1.43E-05	2.29E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	2.29E-05	µg/m^3	N/A	5.10E+00	c	µg/m^3			NO	BSL
	218-01-9	CHRYSENE	2.00E+00 J	3.20E+00 J	1.79E-05	2.87E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	2.87E-05	µg/m^3	N/A	2.00E+01	c	µg/m^3			NO	BSL
	53-70-3	DIBENZ[A,H]ANTHRACENE	5.70E-01 J	8.70E-01 J	5.11E-06	7.80E-06	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	7.80E-06	µg/m^3	N/A	2.00E-02	c	µg/m^3			NO	BSL
	206-44-0	FLUORANTHENE	2.80E+00 J	4.60E+00 J	2.51E-05	4.12E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	4.12E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	193-39-5	INDENO[1,2,3-CD]PYRENE	1.20E+00 J	2.20E+00 J	1.08E-05	1.97E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	1.97E-05	µg/m^3	N/A	2.00E-01	c	µg/m^3			NO	BSL
	85-01-8	PHENANTHRENE	1.10E+00 J	2.10E+00 J	9.86E-06	1.88E-05	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	1.88E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	129-00-0	PYRENE	2.80E+00 J	4.90E+00 J	3.10E-03	5.43E-03	µg/m^3	NASD01	NASD01-000005	2 / 2	N/A	5.43E-03	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	11097-69-1	AROCLOR-1254	6.90E-01 J	8.80E-01 J	2.15E-03	2.74E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.74E-03	µg/m^3	N/A	2.10E-02	c	µg/m^3			NO	BSL
	11096-82-5	AROCLOR-1260	7.30E-01 J	1.00E+00 J	1.46E-03	2.00E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.00E-03	µg/m^3	N/A	2.10E-02	c	µg/m^3			NO	BSL
	NA	**2,3,7,8-TCDD TEQ [7]**	**4.50E-05**	**2.86E-04**	**6.05E-08**	**3.84E-07**	**µg/m^3**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**3.84E-07**	**µg/m^3**	**N/A**	**3.20E-07**	**c**	**µg/m^3**			**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	8.78E+03	1.49E+04	7.87E-02	1.34E-01	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.34E-01	µg/m^3	N/A	2.20E+00	n	µg/m^3			NO	BSL
	7440-36-0	ANTIMONY	3.55E+00 J	4.80E+00 J	3.18E-05	4.30E-05	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.30E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7440-38-2	ARSENIC	1.70E+01	3.00E+01	1.52E-04	2.69E-04	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.69E-04	µg/m^3	N/A	2.90E-03	c	µg/m^3			NO	BSL
	7440-39-3	BARIUM	1.52E+02	2.93E+02	1.36E-03	2.63E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.63E-03	µg/m^3	N/A	2.20E-01	n	µg/m^3			NO	BSL
	7440-41-7	BERYLLIUM	5.15E-01	8.80E-01	4.62E-06	7.89E-06	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	7.89E-06	µg/m^3	N/A	5.10E-03	c	µg/m^3			NO	BSL
	7440-43-9	CADMIUM	5.15E+00	9.50E+00	4.62E-05	8.51E-05	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	8.51E-05	µg/m^3	N/A	4.40E-03	n	µg/m^3			NO	BSL
	7440-70-2	CALCIUM METAL	7.81E+03	1.45E+04	7.00E-02	1.30E-01	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.30E-01	µg/m^3	N/A	N/A		µg/m^3			NO	NUT
	7440-47-3	CHROMIUM[6]	3.79E+01	5.43E+01	3.39E-04	4.87E-04	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.87E-04	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7440-47-3	**CHROMIUM[6]**	**3.79E+01**	**5.43E+01**	**3.39E-04**	**4.87E-04**	**µg/m^3**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**4.87E-04**	**µg/m^3**	**N/A**	**1.50E-04**	**c**	**µg/m^3**			**YES**	**ASL**
	7440-48-4	COBALT	2.38E+01	5.25E+01	2.13E-04	4.71E-04	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.71E-04	µg/m^3	N/A	1.40E-03	c	µg/m^3			NO	BSL
	7440-50-8	COPPER	1.64E+02	2.24E+02	1.47E-03	2.01E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.01E-03	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	57-12-5	CYANIDE	1.42E+01	1.51E+01	1.27E-04	1.35E-04	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.35E-04	µg/m^3	N/A	3.50E-01	n	µg/m^3			NO	BSL
	7439-89-6	IRON	2.57E+04	5.02E+04	2.30E-01	4.50E-01	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.50E-01	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7439-92-1	LEAD	2.34E+02	4.29E+02	2.10E-03	3.84E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	3.84E-03	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7439-95-4	MAGNESIUM	2.33E+03	4.05E+03	2.08E-02	3.63E-02	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	3.63E-02	µg/m^3	N/A	N/A		µg/m^3			NO	NUT
	7439-96-5	MANGANESE	2.77E+02	3.95E+02	2.48E-03	3.54E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	3.54E-03	µg/m^3	N/A	2.20E-02	n	µg/m^3			NO	BSL
	7439-97-6	**MERCURY**	**1.01E+00**	**1.30E+00**	**5.10E-01**	**6.57E-01**	**µg/m^3**	**NASD02**	**NASD02-000005**	**2 / 2**	**N/A**	**6.57E-01**	**µg/m^3**	**N/A**	**1.30E-01**	**n**	**µg/m^3**			**YES**	**ASL**
	7440-02-0	NICKEL	6.00E+01	1.16E+02	5.37E-04	1.04E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.04E-03	µg/m^3	N/A	3.90E-02	n	µg/m^3			NO	BSL
	7440-09-7	POTASSIUM	1.56E+03	2.63E+03	1.39E-02	2.36E-02	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.36E-02	µg/m^3	N/A	N/A		µg/m^3			NO	NUT
	7782-49-2	SELENIUM	2.15E+00 J+	3.10E+00 J+	1.93E-05	2.78E-05	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	2.78E-05	µg/m^3	N/A	8.80E+00	n	µg/m^3			NO	BSL
	7440-22-4	SILVER	1.25E+00	1.90E+00	1.12E-05	1.70E-05	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.70E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7440-23-5	SODIUM	2.35E+02 J	4.67E+02	2.11E-03	4.19E-03	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.19E-03	µg/m^3	N/A	N/A		µg/m^3			NO	NUT
	7440-28-0	THALLIUM	2.80E+00	5.50E+00	2.51E-05	4.93E-05	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	4.93E-05	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	7440-62-2	VANADIUM (FUME OR DUST)	3.70E+01	5.79E+01	3.32E-04	5.19E-04	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	5.19E-04	µg/m^3	N/A	4.40E-02	n	µg/m^3			NO	BSL
	7440-66-6	ZINC	7.36E+02 J	1.16E+03 J	6.60E-03	1.04E-02	µg/m^3	NASD02	NASD02-000005	2 / 2	N/A	1.04E-02	µg/m^3	N/A	N/A		µg/m^3			NO	NTX
	13982-63-3	RADIUM-226	4.51E-01 J	6.12E-01 J	4.04E-06	5.48E-06	pCi/m^3	NASD01	NASD01-000005	2 / 2	N/A	5.48E-06	µg/m^3	N/A	1.05E-04	c	pCi/m^3			NO	BSL
	15262-20-1	RADIUM-228	5.43E-01 J	5.72E-01 J	4.87E-06	5.12E-06	pCi/m^3	NASD01	NASD01-000005	2 / 2	N/A	5.12E-06	µg/m^3	N/A	3.30E-05	c	pCi/m^3			NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for industrial air (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene
RSL value for Aroclor-1260 used for Aroclor-1268
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 1 km^2 with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)
[6] Chromium screened against both trivalent and hexavalent chromium RSLs.
[7] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
µg/m^3 = micrograms per cubic meter
N/A = Not available
pCi/m^3 = picocuries per cubic meter

Air concentration = soil concentration x (1/PEF + 1/VF)

PEF = particulate emission factor; VF = volatilization factor

PEF for construction worker = 1.1 x 10^8 m^3/kg (Calculated using equations 5-5 and 5-6 from EPA, 2002, see Table 2.10a).

VF calculated in Table 2.10b using equations from EPA, 2002.

PEF and VF calculations based on assumed maximum area of exposed trench that would be open at a given time during a utility worker project, estimated to be 100 linear feet of a 16 feet wide trench.

Table 2.10a
Calculation of Construction Worker Exposure Scenario PEF

Construction Scenario PEF (m^3/kg) (Lowest of Excavation Activities and Wind PEF and Contribution from Traffic on Unpaved Road PEF) = 1.12E+08

Traffic on Unpaved Road PEF

$$PEF_{SC} = {}^{Q}/_{C_{Sr}} \times \frac{1}{F_D} \times \frac{T \times A_R}{556 \times ({}^{W}/_{3})^{0.4} \times \left(\frac{365\ d/yr - p}{365\ d/yr}\right) \times \sum VKT}$$

Equation 5-5 from EPA, 2002

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

Equation 5-6 from EPA, 2002

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

Equation E-16 from Appendix E of EPA, 2002

Variable	Value	Units	Definition	Source
A	12.9	unitless	Constant	Default
B	5.74	unitless	Constant	Default
C	71.8	unitless	Constant	Default
T	31,500,000	seconds	Total time over which construction occurs	Assumed
AR	74	m2	Surface area of contaminated road segment	Calculated, site-specific (square root of site surface contamination configured as a square x default width of road segment of 20 ft)
s	8.50	%	Road surface silt content	Default
W	11	tons	Mean weight of vehicle	Assumed (5 x 2-ton and 5 x 20-ton trucks per day)
Mdry	0.2	%	Road surface material moisture content under dry, uncontrolled conditions	Default
p	120	days	Number of days with at least 0.01 inches of precipitation	Lookup value (Exhibit 5-2 from EPA, 2002)
# days/truck	260	days		Assumed (5 days per week for 52 weeks)
SVKT	63	km	Sum of fleet vehicle kilometers traveled during the exposure duration	Assumed (3 vehicles x 0.045 km/day x 250 days)
LR	40	feet	Road length	Assumed (square root of the area)
WR	20	feet	Road width	Assumed
As	0.0367	acres	Areal extent of site (or site contamination)	Site-specific
tc	8,760	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.186	unitless	Dispersion correction factor	Calculated (Equation E-16 from Appendix E of EPA, 2002)
Q/Csr	40.4	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	Calculated (Equation 5-6 from EPA, 2002)
PEF		m3/kg	Subchronic road particular emission factor	Calculated

Excavation Activities and Wind PEF

Site Assumptions

Variable	Value	Units	Source
Site Area	0.0367	acres	Site-specific
Site Area	1,599	square feet	Calculated, site-specific
Site Area	149	square meters	Calculated, site-specific
Site length	40	feet, assumed to be a square	Calculated, site-specific
# passes	6	# passes to cover entire site	Calculated, site-specific

Wind Erosion (Equation E-20 from Appendix E of EPA, 2002)

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760\ hr/yr$$

Variable	Value	Units	Definition	Source
V	0	unitless	Fraction of vegetative cover	Default
Um	4.69	m/s	Mean annual windspeed	Default
Ut	11.3	m/s	Equivalent threshold value of windspeed at 7m	Default
F(x)	0.194	unitless	Fuction dependent on Um/Ut derived	Default
Asurf	149	m2	Areal extent of site with undisturbed surface soil contamination	Site-specific, calculated
ED	0.054794521	year	Exposure duration	Assumed (20-day duration)
Mwind	35	g	Unit mass emitted from wind erosion	Calculated

Excavation Emissions (Equation E-21 from Appendix E of EPA, 2002)

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times A_{excav} \times D_{excav} \times N_A \times 10^3\ g/kg$$

Variable	Value	Units	Definition	Source
Um	4.69	m/s	Mean windspeed during construction	Default
M	12	%	Gravimetric soil moisture content	Default
Psoil	1.68	Mg/m3	In-situ soil density	Default
Aexcav	149	m2	Areal extent of excavation	Assumed (all of the trench area is graded)
dexcav	3.03030303	m	Average depth of excavation	Assumed (10-foot excavation)
NA	2	unitless	Number of times soil is dumped	Default
Mexcav	184.4943507	g	Unit mass emitted from excavation	Calculated

Dozing Emissions (Equation E-22 from Appendix E of EPA, 2002)

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
s	6.9	%	Soil silt content	Default
M	7.9	%	Gravimetric soil moisture content	Default
SVKT	0.15	km	Sum of dozing kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
S	11.4	kph	Average dozing speed	Default
Mdoz	4.346593279	g	Unit mass emitted from dozing operations	Calculated

Grading Emissions (Equation E-23 from Appendix E of EPA, 2002)

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
S	11.4	kph	Average grading speed	Default
SVKT	0.15	km	Sum of grading kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
Mgrade	63.87535842	g	Unit mass emitted from grading operations	Calculated

Tilling Emissions (Equation E-24 from Appendix E of EPA, 2002)

$$M_{till} = 1.1(s)^{0.6} \times A_{till} \times 4{,}047\, m^2/acre \times 10^{-4}\, ha/m^2 \times 10^3 g/kg \times N_A$$

Variable	Value	Units	Definition	Source
s	18	%	Soil silt content	Default
Atill	0.01835	acre	Areal extent of tilling	Calculated (assume one-half the site is tilled for re-vegetation)
NA	2	unitless	Number of times soil is tilled	Default
Mtill	0	g	Unit mass emitted from tilling or similar operations	Assumed no tilling takes place for trenching

Table 2.10a
Calculation of Construction Worker Exposure Scenario PEF

<J'T> - unit emission flux (Equation E-25 from Appendix E of EPA, 2002)

$$< J_T^{\cdot\cdot} >= \frac{M_{wind} + M_{ecav} + M_{doz} + M_{grade} + M_{till}}{A_c \times T}$$

Variable	Value	Units	Definition	Source
Ac	148.595702	m2	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
T	1728000	s	Duration of construction	Assumed (20-day duration)
<J'T>	1.12217E-06	g/m2-s	Total time-averaged unit emission flux for construction activities other than traffic on unpaved road	

PEF'sc (Equation E-26 from Appendix E of EPA, 2002)

$$PEF_{sc}^{\cdot\cdot} = Q/C_{sa} \times \frac{1}{F_D} \times \frac{1}{< J_T^{\cdot\cdot} >}$$

Variable	Value	Units	Definition	Source
Ac	0.0367	acres	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration and the emission flux at the center of the square emission source	Calculated (equation E-15 from Appendix E of EPA, 2002)
tc	480	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.196311737	unitless	Dispersion correction factor	Calculated (equation E-16 from Appendix E of EPA, 2002)
PEF'sc	1.12E+08	m3/kg	Subchronic particulate emission factor for construction activities other than traffic on unpaved roads	

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

Table 2.10b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical		Diffusivity in Air (Di) (cm2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (Dw) (cm2/s)	Soil Organic Carbon Partition Coeff. (Koc) (cm3/g)	Soil Water Partition Coeff. (Kd = Koc x Foc) (g/cm3)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (DA) (cm2/s)	Volatilization Factor (VF) (m3/kg)
Volatile Organics									
2-Butanone (Methyl ethyl ketone)	78-93-3	9.14E-02	2.33E-03	1.02E-05	4.51E+00	2.71E-02	2.23E+05	8.94E-05	4.66E+03
Acetone	67-64-1	1.06E-01	1.43E-03	1.15E-05	2.36E+00	1.42E-02	1.00E+06	7.1E-05	5.2E+03
Carbon Disulfide	75-15-0	1.06E-01	5.89E-01	1.30E-05	2.17E+01	1.30E-01	2.16E+03	9.8E-03	4.5E+02
Methylene chloride	75-09-2	1.0E-01	1.3E-01	1.3E-05	2.2E+01	1.30E-01	1.3E+04	2.8E-03	8.4E+02
2-Methylnaphthalene	91-57-6	5.2E-02	2.1E-02	7.8E-06	2.5E+03	1.49E+01	2.5E+01	4.0E-06	2.2E+04
Acenaphthene	83-32-9	5.1E-02	7.5E-03	8.3E-06	5.0E+03	3.02E+01	3.9E+00	6.7E-07	5.4E+04
Acetophenone	98-86-2	6.5E-02	4.3E-04	8.7E-06	5.2E+01	3.11E-01	6.1E+03	3.7E-06	2.3E+04
Anthracene	120-12-7	3.9E-02	2.3E-03	7.9E-06	1.6E+04	9.82E+01	4.3E-02	4.9E-08	2.0E+05
Benzo(a)anthracene	56-55-3	2.61E-02	4.91E-04	6.75E-06	1.77E+05	1.06E+03	9.40E-03	6.8E-10	1.7E+06
Biphenyl	92-52-4	4.70E-02	1.26E-02	7.60E-06	5.10E+03	3.06E+01	4.00E+00	1.0E-06	1.5E+04
Dibenzofuran	132-64-9	6.51E-02	8.71E-03	7.38E-06	9.16E+03	5.50E+01	3.10E+00	5.5E-07	5.9E+04
Fluorene	86-73-7	4.4E-02	3.9E-03	7.9E-06	9.2E+03	5.50E+01	1.7E+00	1.7E-07	1.1E+05
Naphthalene	91-20-3	6.0E-02	1.8E-02	8.4E-06	1.5E+03	9.26E+00	3.1E+01	6.2E-06	1.8E+04
Pyrene	129-00-0	2.8E-02	4.9E-04	7.2E-06	5.4E+04	3.26E+02	1.4E-01	2.3E-09	9.1E+05
4,4'-DDE	72-55-9	2.3E-02	1.7E-03	5.9E-06	1.2E+05	7.05E+02	4.0E-02	3.0E-09	8.0E+05
Aldrin	309-00-2	2.3E-02	1.8E-03	5.8E-06	8.2E+04	4.92E+02	1.7E-02	4.5E-09	6.6E+05
Chlordane	12789-03-6	2.1E-02	2.0E-03	5.4E-06	6.8E+04	4.05E+02	5.6E-02	5.7E-09	5.8E+05
Heptachlor	76-44-8	2.2E-02	1.2E-02	5.7E-06	4.1E+04	2.48E+02	1.8E-01	5.8E-08	1.8E+05
Aroclor-1248	12672-29-6	1.63E-02	1.80E-02	3.94E-06	7.65E+04	4.59E+02	1.00E-01	3.4E-08	2.4E+05
Aroclor-1254	11097-69-1	2.37E-02	1.16E-02	6.10E-06	1.31E+05	7.83E+02	4.30E-02	1.9E-08	3.2E+05
Aroclor-1260	11096-82-5	2.20E-02	1.37E-02	5.61E-06	3.50E+05	2.10E+03	1.44E-02	7.7E-09	5.0E+05
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	4.24E-02	2.07E-03	5.69E-06	3.50E+05	2.10E+03	7.53E-04	2.3E-09	9.3E+05
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	4.67E-02	1.16E-02	6.06E-06	1.31E+05	7.83E+02	3.40E-03	3.7E-08	2.3E+05
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	4.44E-02	2.80E-03	5.86E-06	2.09E+05	1.26E+03	2.23E-03	5.3E-09	6.0E+05
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	4.67E-02	3.78E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	1.2E-08	4.0E+05
2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	4.67E-02	7.77E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	2.5E-08	2.8E+05
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	4.67E-02	1.18E-02	6.06E-06	1.28E+05	7.67E+02	1.34E-02	3.8E-08	2.3E+05
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	4.67E-02	7.77E-03	6.06E-06	1.28E+05	7.67E+02	7.33E-03	2.5E-08	2.8E+05
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	4.94E-02	9.12E-03	6.27E-06	7.81E+04	4.69E+02	3.22E-02	5.1E-08	1.9E+05
2,3,7,8-TCDD	1746-01-6	4.70E-02	2.04E-03	6.76E-06	2.49E+05	1.49E+03	2.00E-04	3.5E-09	7.5E+05
Polychlorinated Biphenyls (high risk)	NA	2.43E-02	1.70E-02	6.27E-06	7.81E+04	4.69E+02	7.00E-01	4.7E-08	2.0E+05
Mercury	7439-97-6	3.10E-02	3.50E-01	6.30E-06	NA	1.00E+00	6.00E-02	5.0E-04	2.0E+03

Volatilization factor (VF) (m^3/kg)
Equation 5-14 of EPA, 2002

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4}\, m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Apparent Diffusivity (DA) (cm^2/s)
Equation 5-14 of EPA, 2002

$$D_A = \frac{\left[\left(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w\right)/n^2\right]}{\rho_b K_d + \theta_w + \theta_a H'}$$

Variable	Value	Unit	Definition	Source
Q/C =	132.8562746	g/m^2-s per kg/m^3	Q/Csa * (1/Fd)	Intermediate calculation
Fd	0.185	unitless	Dispersion correction factor	Default
Qa	0.28	Lair/Lwater	Air-filled soil porosity	n - Qw (Equation 5-14 of EPA, 2002)
n	0.43	Lpore/Lsoil	Total soil porosity	1 - (rb/rs) (Equation 5-14 of EPA, 2002)
Qw	0.15	Lwater/Lsoil	Water-filled soil porosity	Default
rs	2.65	g/cm^3	Soil particle density	Default
rb	1.5	g/cm^3	Dry soil bulk density	Default
T	3.154E+07	seconds	Total time over which construction occurs	Calculated (1-year duration)
foc	0.006	g/g	Fraction organic carbon in soil	Default
A	2.4538	unitless	Constant	Default
Ac	0.0367	acres	Areal extent of soil contamination	Site-specific
B	17.566	unitless	Constant	Default
C	189.0426	unitless	Constant	Default
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the volatilization flux at the center of a square site	Calculated (Equation 5-15 of EPA, 2002)

Chemical and physical properties from parameter table for Regional Screening Levels, June 2017.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.

Table 2.11
Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening Toxicity Value	Potential ARAR/ TBC Value	Potential ARAR/ TBC Source	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Northern Drainage Channel	106-44-5	4-METHLYPHENOL	3.70E+00 J	1.10E+01	ug/L	NASW02	NASW02	2 / 2	N/A	1.10E+01	N/A	1.90E+03 n [4]	N/A		NO	BSL
	105-60-2	CAPROLACTAM	2.70E+00 J	2.70E+00 J	ug/L	NASW01	NASW01	1 / 2	1.00E+01 - 1.00E+01	2.70E+00	N/A	9.90E+03 n [4]	N/A		NO	BSL
	NA	**2,3,7,8-TCDD TEQ [8]**	**1.73E-05**	**1.73E-05**	**ug/L**	**NASW02**	**NASW02**	**1 / 1**	**N/A**	**1.73E-05**	**N/A**	**5.00E-08 [6]**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	1.52E+02 J	1.10E+03	ug/L	NASW02	NASW02	2 / 2	N/A	1.10E+03	N/A	2.00E+04 n [4]	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**3.90E+00**	**5.90E+00 J**	**ug/L**	**NASW01**	**NASW01**	**2 / 2**	**N/A**	**5.90E+00**	**N/A**	**5.20E-01 c [4]**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	8.29E+01 J	1.59E+02 J	ug/L	NASW02	NASW02	2 / 2	N/A	1.59E+02	N/A	2.00E+03 [6]	N/A		NO	BSL
	7440-43-9	CADMIUM	9.40E-01 J	9.40E-01 J	ug/L	NASW02	NASW02	1 / 2	1.00E+00 - 1.00E+00	9.40E-01	N/A	5.00E+00 [6]	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	1.02E+05	1.06E+05	ug/L	NASW02	NASW02	2 / 2	N/A	1.06E+05	N/A	N/A	N/A		NO	NUT
	7440-47-3	**CHROMIUM**	**1.35E+01 J**	**1.35E+01 J**	**ug/L**	**NASW02**	**NASW02**	**1 / 2**	**2.00E+00 - 2.00E+00**	**1.35E+01**	**N/A**	**3.50E-01 c [5]**	**N/A**		**YES**	**ASL**
	7440-48-4	COBALT	1.70E+00	2.40E+00	ug/L	NASW02	NASW02	2 / 2	N/A	2.40E+00	N/A	6.00E+00 n [4]	N/A		NO	BSL
	7440-50-8	COPPER	3.70E+00	4.70E+00	ug/L	NASW01	NASW01	2 / 2	N/A	4.70E+00	N/A	8.00E+02 n [4]	N/A		NO	BSL
	7439-89-6	**IRON**	**3.08E+03**	**1.13E+04**	**ug/L**	**NASW02**	**NASW02**	**2 / 2**	**N/A**	**1.13E+04**	**N/A**	**3.00E+02 [6]**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**5.90E+00 J**	**1.82E+01 J**	**ug/L**	**NASW02**	**NASW02**	**2 / 2**	**N/A**	**1.82E+01**	**N/A**	**1.50E+01 [6]**	**N/A**		**YES**	**ASL**
	7439-95-4	MAGNESIUM	1.07E+04	1.12E+04	ug/L	NASW01	NASW01	2 / 2	N/A	1.12E+04	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	2.38E+02	2.83E+02	ug/L	NASW02	NASW02	2 / 2	N/A	2.83E+02	N/A	4.30E+02 n [4]	N/A		NO	BSL
	7440-02-0	NICKEL	6.80E+00	1.78E+01	ug/L	NASW02	NASW02	2 / 2	N/A	1.78E+01	N/A	3.90E+02 n [4]	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.50E+04	1.74E+04	ug/L	NASW01	NASW01	2 / 2	N/A	1.74E+04	N/A	N/A	N/A		NO	NUT
	7440-23-5	SODIUM	2.26E+04	2.38E+04	ug/L	NASW02	NASW02	2 / 2	N/A	2.38E+04	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**2.20E+00 J**	**2.20E+00 J**	**ug/L**	**NASW02**	**NASW02**	**1 / 2**	**1.00E+00 - 1.00E+00**	**2.20E+00**	**N/A**	**2.00E-01 n [4]**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	1.80E+00 J	6.20E+00	ug/L	NASW02	NASW02	2 / 2	N/A	6.20E+00	N/A	8.60E+01 n [4]	N/A		NO	BSL
	7440-66-6	ZINC	2.59E+01	1.13E+02	ug/L	NASW02	NASW02	2 / 2	N/A	1.13E+02	N/A	6.00E+03 n [4]	N/A		NO	BSL
	13982-63-3	**RADIUM-226**	**2.48E+01 J**	**2.48E+01 J**	**pCi/L**	**NASW01**	**NASW01**	**1 / 2**	**2.72E+01 - 2.72E+01**	**2.48E+01**	**N/A**	**4.30E-03 [4]**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Level (RSL) for tapwater (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0)

[5] Chromium concentrations screened against hexavalent chromium 10x EPA tap water RSL.

[6] Code of Virginia, Water Quality Standards; Public Water Supply (96VAC25-260-140).

[7] Rationale Codes

Selection Reason: Above Screening Levels (ASL)

Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
ug/L = micrograms per liter
N/A = Not available
pCi/L = picocuries per liter

[8] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Paradise Creek	79-20-9	METHYL ACETATE	2.40E-02	1.30E-01	mg/kg	PCSD08	PCSD08-000005	5 / 24	7.20E-03 - 1.50E-02	1.30E-01	N/A	7.80E+04 n	N/A		NO	BSL
	75-09-2	METHYLENE CHLORIDE	1.20E-02	1.20E-02	mg/kg	PCSD10	PCSD10-005020	1 / 24	7.20E-03 - 1.50E-02	1.20E-02	N/A	3.50E+02 n	N/A		NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	1.20E-01 J	1.20E-01 J	mg/kg	PCSD02	PCSD02_TOX00	1 / 28	2.70E-01 - 5.40E-01	1.20E-01	N/A	2.40E+02 n	N/A		NO	BSL
	83-32-9	ACENAPHTHENE	1.90E-01 J	3.00E-01 J	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	3.00E-01	N/A	3.60E+03 n	N/A		NO	BSL
	208-96-8	ACENAPHTHYLENE	6.60E-02 J	1.10E-01 J	mg/kg	PCSD12; PCSD02	PCSD12_TOX00; PCSD02_TOX00	3 / 28	2.70E-01 - 5.40E-01	1.10E-01	N/A	3.60E+03 n	N/A		NO	BSL
	120-12-7	ANTHRACENE	1.40E-01 J	5.90E-01 J	mg/kg	PCSD02	PCSD02_TOX00	6 / 28	2.70E-01 - 5.40E-01	5.90E-01	N/A	1.80E+04 n	N/A		NO	BSL
	56-55-3	BENZO[A]ANTHRACENE	2.70E-01 J	1.50E+00	mg/kg	PCSD04	PCSD04-000005	13 / 28	2.70E-01 - 5.40E-01	1.50E+00	N/A	1.10E+01 c	N/A		NO	BSL
	50-32-8	**BENZO[A]PYRENE**	**1.80E-01 J**	**1.60E+00**	**mg/kg**	**PCSD12**	**PCSD12_TOX00**	**19 / 28**	**2.70E-01 - 5.30E-01**	**1.60E+00**	**N/A**	**1.10E+00 c**	**N/A**		**YES**	**ASL**
	205-99-2	BENZO[B]FLUORANTHENE	2.00E-01 J	3.40E+00	mg/kg	PCSD12	PCSD12_TOX00	19 / 28	2.70E-01 - 5.30E-01	3.40E+00	N/A	1.10E+01 c	N/A		NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	1.40E-01 J	6.30E-01	mg/kg	PCSD04	PCSD04-000005	16 / 28	2.70E-01 - 5.30E-01	6.30E-01	N/A	1.80E+03 n	N/A		NO	BSL
	207-08-9	BENZO[K]FLUORANTHENE	1.90E-01 J	1.30E+00 J	mg/kg	PCSD12	PCSD12_TOX00	19 / 28	2.70E-01 - 5.30E-01	1.30E+00	N/A	1.10E+02 c	N/A		NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	2.70E-01 J	3.30E-01 J	mg/kg	PCSD05	PCSD05-005020	4 / 28	2.70E-01 - 5.90E-01	3.30E-01	N/A	2.90E+03	N/A		NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.80E-01 J	7.90E-01 J	mg/kg	PCSD09	PCSD09-005020	18 / 28	2.70E-01 - 4.80E-01	7.90E-01	N/A	3.90E+02 c	N/A		NO	BSL
	105-60-2	CAPROLACTAM	4.80E-01 J	4.80E-01 J	mg/kg	PCSD11	PCSD11-005020	1 / 28	5.20E-01 - 1.10E+00	4.80E-01	N/A	3.10E+04 n	N/A		NO	BSL
	86-74-8	CARBAZOLE	1.90E-01 J	3.80E-01 J	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	5.20E-01 - 1.10E+00	3.80E-01	N/A	N/A	N/A		NO	NTX
	218-01-9	CHRYSENE	2.70E-01 J	1.50E+00	mg/kg	PCSD12	PCSD12_TOX00	17 / 28	2.70E-01 - 5.30E-01	1.50E+00	N/A	1.10E+03 c	N/A		NO	BSL
	132-64-9	DIBENZOFURAN	7.80E-02 J	1.80E-01 J	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	1.80E-01	N/A	7.30E+01 n	N/A		NO	BSL
	84-74-2	DI-N-BUTYL PHTHALATE	4.20E-01	1.60E+00	mg/kg	PCSD04	PCSD04-000005	3 / 28	2.70E-01 - 5.90E-01	1.60E+00	N/A	6.30E+03 n	N/A		NO	BSL
	206-44-0	FLUORANTHENE	2.80E-01 J	4.00E+00	mg/kg	PCSD04	PCSD04-000005	21 / 28	5.20E-01 - 1.00E+00	4.00E+00	N/A	2.40E+03 n	N/A		NO	BSL
	86-73-7	FLUORENE	1.80E-01 J	2.60E-01 J	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	2.60E-01	N/A	2.40E+03 n	N/A		NO	BSL
	193-39-5	INDENO[1,2,3-CD]PYRENE	1.90E-01 J	5.50E-01	mg/kg	PCSD04	PCSD04-000005	11 / 28	2.70E-01 - 5.30E-01	5.50E-01	N/A	1.10E+01 c	N/A		NO	BSL
	91-20-3	NAPHTHALENE	5.10E-02 J	3.20E-01 J	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	3.20E-01	N/A	3.80E+01 c	N/A		NO	BSL
	85-01-8	PHENANTHRENE	2.00E-01 J	3.20E+00	mg/kg	PCSD04	PCSD04-000005	8 / 28	2.70E-01 - 5.40E-01	3.20E+00	N/A	1.80E+03 n	N/A		NO	BSL
	129-00-0	PYRENE	2.30E-01 J	3.80E+00	mg/kg	PCSD12	PCSD12_TOX00	20 / 28	2.70E-01 - 5.30E-01	3.80E+00	N/A	1.80E+03 n	N/A		NO	BSL
	72-54-8	4,4'-DDD	6.70E-03	2.60E-02 J	mg/kg	PCSD09	PCSD09_TOX00	7 / 28	5.19E-03 - 1.06E-02	2.60E-02	N/A	1.90E+00 n	N/A		NO	BSL
	72-55-9	4,4'-DDE	1.10E-02	6.26E-02 J	mg/kg	PCSD09	PCSD09_TOX00	11 / 28	5.19E-03 - 1.02E-02	6.26E-02	N/A	2.00E+01 c	N/A		NO	BSL
	50-29-3	4,4'-DDT	6.30E-03 J	1.08E-01 J	mg/kg	PCSD09	PCSD09_TOX00	7 / 28	5.19E-03 - 1.06E-02	1.08E-01	N/A	1.90E+01 c	N/A		NO	BSL
	12789-03-6	CHLORDANE	1.89E-02	3.66E-02	mg/kg	PCSD04	PCSD04_TOX00	4 / 28	-	3.66E-02	N/A	1.70E+01 c	N/A		NO	BSL
	12672-29-6	AROCLOR-1248	5.60E-02 J	5.20E-01 J	mg/kg	PCSD04	PCSD04-005020	4 / 28	5.20E-02 - 1.10E-01	5.20E-01	N/A	2.30E+00 c	N/A		NO	BSL
	11097-69-1	AROCLOR-1254	1.90E-01 J	2.05E-01 J	mg/kg	PCSD04	PCSD04_TOX00	3 / 28	5.20E-02 - 1.10E-01	2.05E-01	N/A	1.20E+00 n	N/A		NO	BSL
	11096-82-5	AROCLOR-1260	1.00E-02 J	1.85E-01	mg/kg	PCSD04	PCSD04_TOX00	24 / 28	5.20E-02 - 7.40E-02	1.85E-01	N/A	2.40E+00 c	N/A		NO	BSL
	11100-14-4	AROCLOR-1268	4.40E-02 J	1.20E-01 J	mg/kg	PCSD09	PCSD09-005020	3 / 28	5.20E-02 - 1.10E-01	1.20E-01	N/A	2.40E+00 c	N/A		NO	BSL
	NA	**TEQ for PCB Congeners [7]**	**5.29E-06**	**9.62E-05**	**mg/kg**	**PCSD04**	**PCSD04-000005**	**4 / 4**	**N/A**	**9.62E-05**	**N/A**	**4.80E-05 c**	**N/A**		**YES**	**ASL**
	NA	High Risk PCBs [8]	1.43E-01	2.25E+00	mg/kg	PCSD04	PCSD04-000005	4 / 4	N/A	2.25E+00	N/A	2.30E+00 c	N/A		NO	BSL
	NA	**2,3,7,8-TCDD TEQ [9]**	**6.07E-07**	**5.41E-05**	**mg/kg**	**PCSD04**	**PCSD04_TOX00**	**16 / 16**	**N/A**	**5.41E-05**	**N/A**	**4.80E-05 c**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	2.80E+03	2.00E+04	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	2.00E+04	N/A	7.70E+04 n	N/A		NO	BSL
	7440-36-0	ANTIMONY	6.70E-01 J	6.70E-01 J	mg/kg	PCSD01	PCSD01-005020	1 / 28	6.40E+00 - 1.65E+01	6.70E-01	N/A	3.10E+01 n	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**2.50E+00**	**2.21E+01 J**	**mg/kg**	**PCSD05**	**PCSD05-000005**	**28 / 28**	**N/A**	**2.21E+01**	**N/A**	**6.80E+00 c**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	1.48E+01 J	9.79E+01	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	9.79E+01	N/A	1.50E+04 n	N/A		NO	BSL
	7440-41-7	BERYLLIUM	1.90E-01 J	2.20E+00	mg/kg	PCSD04	PCSD04-005020	28 / 28	N/A	2.20E+00	N/A	1.60E+02 n	N/A		NO	BSL
	7440-43-9	CADMIUM	3.50E-01 J	4.05E+00	mg/kg	PCSD07	PCSD07-005020	27 / 28	1.40E+00 - 1.40E+00	4.05E+00	N/A	7.10E+01 n	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	6.37E+02	3.34E+04	mg/kg	PCSD06	PCSD06-000005	28 / 28	N/A	3.34E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	1.21E+01	1.11E+03	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	1.11E+03	N/A	1.20E+05 n	N/A		NO	BSL
	7440-47-3	**CHROMIUM[6]**	**1.21E+01**	**1.11E+03**	**mg/kg**	**PCSD04**	**PCSD04-000005**	**28 / 28**	**N/A**	**1.11E+03**	**N/A**	**3.00E+00 c**	**N/A**		**YES**	**ASL**
	18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	9.90E-01	2.18E+00	mg/kg	PCSD05	PCSD05-005020	2 / 12	5.90E-01 - 1.21E+00	2.18E+00	N/A	3.00E+00 c	N/A		NO	BSL
	7440-48-4	**COBALT**	**4.50E-01 J**	**6.12E+02**	**mg/kg**	**PCSD04**	**PCSD04-000005**	**28 / 28**	**N/A**	**6.12E+02**	**N/A**	**2.30E+01 n**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	3.06E+01	3.98E+02	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	3.98E+02	N/A	3.10E+03 n	N/A		NO	BSL
	57-12-5	CYANIDE	1.00E+00 J	1.00E+00 J	mg/kg	PCSD10	PCSD10-005020	1 / 24	6.80E-01 - 1.50E+00	1.00E+00	N/A	2.30E+01 n	N/A		NO	BSL
	7439-89-6	IRON	7.43E+03	3.93E+04	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	3.93E+04	N/A	5.50E+04 n	N/A		NO	BSL
	7439-92-1	LEAD	6.04E+01	3.02E+02	mg/kg	PCSD04	PCSD04-005020	28 / 28	N/A	3.02E+02	N/A	2.00E+03	N/A		NO	BSL
	7439-95-4	MAGNESIUM	1.04E+03	6.93E+03	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	6.93E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	5.79E+01	3.45E+02	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	3.45E+02	N/A	1.80E+03 n	N/A		NO	BSL
	7439-97-6	MERCURY	1.50E-01	1.50E+00	mg/kg	PCSD05	PCSD05-005020	28 / 28	N/A	1.50E+00	N/A	7.80E+00 n	N/A		NO	BSL
	7440-02-0	NICKEL	5.30E+00	9.42E+02	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	9.42E+02	N/A	1.50E+03 n	N/A		NO	BSL

Table 2.12
Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-09-7	POTASSIUM	7.87E+02	4.20E+03	mg/kg	PCSD06	PCSD06-005020	28 / 28	N/A	4.20E+03	N/A	N/A	N/A		NO	NUT
	7440-22-4	SILVER	6.40E-01 J	3.30E+00	mg/kg	PCSD07	PCSD07-005020	24 / 28	1.80E+00 - 2.80E+00	3.30E+00	N/A	3.90E+02 n	N/A		NO	BSL
	7440-23-5	SODIUM	1.62E+03 J	1.16E+04	mg/kg	PCSD08	PCSD08-000005	28 / 28	N/A	1.16E+04	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**3.10E-01 J-**	**2.00E+00 J**	**mg/kg**	**PCSD12**	**PCSD12-005020**	**20 / 28**	**3.50E+00 - 6.90E+00**	**2.00E+00**	**N/A**	**7.80E-01 n**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	1.01E+01	5.53E+01	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	5.53E+01	N/A	3.90E+02 n	N/A		NO	BSL
	7440-66-6	ZINC	6.14E+01	1.48E+03	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	1.48E+03	N/A	2.30E+04 n	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**4.39E-01 J**	**1.58E+00 J**	**pCi/g**	**PCSD08**	**PCSD08-005020**	**24 / 24**	**N/A**	**1.58E+00**	**N/A**	**1.71E-01 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**2.95E-01 J**	**9.08E-01 J**	**pCi/g**	**PCSD04**	**PCSD04-000005**	**24 / 24**	**N/A**	**9.08E-01**	**N/A**	**1.48E-01 c**	**N/A**		**YES**	**ASL**
	10045-97-3	**CESIUM-137**	**1.54E-02**	**4.67E-01**	**pCi/g**	**PCSD05**	**PCSD05-000005**	**22 / 22**	**N/A**	**4.67E-01**	**N/A**	**4.57E-01 c**	**N/A**		**YES**	**ASL**
	15092-94-1	**LEAD-212**	**3.75E-01 J**	**1.23E+00 J**	**pCi/g**	**PCSD08**	**PCSD08-005020**	**24 / 24**	**N/A**	**1.23E+00**	**N/A**	**1.60E-01 c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**3.42E-01 J**	**1.04E+00 J**	**pCi/g**	**PCSD04**	**PCSD04-005020**	**24 / 24**	**N/A**	**1.04E+00**	**N/A**	**1.32E-01 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**6.43E+00**	**1.88E+01**	**pCi/g**	**PCSD08**	**PCSD08-005020**	**24 / 24**	**N/A**	**1.88E+01**	**N/A**	**1.51E+00 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**3.94E-01**	**1.38E+00**	**pCi/g**	**PCSD08**	**PCSD08-005020**	**24 / 24**	**N/A**	**1.38E+00**	**N/A**	**1.00E-01 c**	**N/A**		**YES**	**ASL**
	10098-97-2	STRONTIUM-90	4.81E-01	4.81E-01	pCi/g	PCSD10	PCSD10-000005	1 / 24	2.38E-01 - 3.75E-01	4.81E-01	N/A	3.13E+01 c	N/A		NO	BSL
	14913-50-9	**THALLIUM-208**	**1.18E-01 J**	**4.14E-01 J**	**pCi/g**	**PCSD08**	**PCSD08-005020**	**24 / 24**	**N/A**	**4.14E-01**	**N/A**	**6.61E-02 c**	**N/A**		**YES**	**ASL**
	15117-96-1	URANIUM-235	6.67E-02 J	1.64E-01 J	pCi/g	PCSD08	PCSD08-000005	10 / 11	1.07E-01 - 1.07E-01	1.64E-01	N/A	4.71E-01 c	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Level (RSL) for residential soil (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0)
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 14.09 acres (~100,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
RSL for Aroclor-1260 used as a surrogate for Aroclor-1268
RSL value for methyl mercury used for mercury

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value

mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

[6] Although 50% of the initial sediment samples were speciated; hexavalent chromium analysis performed only on the 0.5 to 2 foot bgs samples; therefore, total chromium concentrations screened against both trivalent and hexavalent chromium RSLs.

[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Paradise Creek	79-20-9	METHYL ACETATE	2.40E-02	1.30E-01	7.74E-03	4.19E-02	mg/kg	PCSD08	PCSD08-000005	5 / 24	7.20E-03 - 1.50E-02	4.19E-02		N/A			NO	NTX
	75-09-2	METHYLENE CHLORIDE	1.20E-02	1.20E-02	1.43E-02	1.43E-02	mg/kg	PCSD10	PCSD10-005020	1 / 24	7.20E-03 - 1.50E-02	1.43E-02		2.60E+02 n			NO	BSL
	91-57-6	2-METHYLNAPHTHALENE	1.20E-01 J	1.20E-01 J	5.42E-03	5.42E-03	mg/kg	PCSD02	PCSD02_TOX00	1 / 28	2.70E-01 - 5.40E-01	5.42E-03		N/A			NO	NTX
	83-32-9	ACENAPHTHENE	1.90E-01 J	3.00E-01 J	3.54E-03	5.58E-03	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	5.58E-03		N/A			NO	NTX
	208-96-8	ACENAPHTHYLENE	6.60E-02 J	1.10E-01 J	5.92E-07	9.86E-07	mg/kg	PCSD12; PCSD02	PCSD12_TOX00; PCSD02_TOX00	3 / 28	2.70E-01 - 5.40E-01	9.86E-07		N/A			NO	NTX
	120-12-7	ANTHRACENE	1.40E-01 J	5.90E-01 J	7.01E-04	2.95E-03	mg/kg	PCSD02	PCSD02_TOX00	6 / 28	2.70E-01 - 5.40E-01	2.95E-03		N/A			NO	NTX
	56-55-3	BENZO[A]ANTHRACENE	2.70E-01 J	1.50E+00	1.63E-04	9.03E-04	mg/kg	PCSD04	PCSD04-000005	13 / 28	2.70E-01 - 5.40E-01	9.03E-04		2.00E-01 c			NO	BSL
	50-32-8	BENZO[A]PYRENE	1.80E-01 J	1.60E+00	1.61E-06	1.43E-05	mg/kg	PCSD12	PCSD12_TOX00	19 / 28	2.70E-01 - 5.30E-01	1.43E-05		8.80E-04 n			NO	BSL
	205-99-2	BENZO[B]FLUORANTHENE	2.00E-01 J	3.40E+00	1.79E-06	3.05E-05	mg/kg	PCSD12	PCSD12_TOX00	19 / 28	2.70E-01 - 5.30E-01	3.05E-05		2.00E-01 c			NO	BSL
	191-24-2	BENZO[G,H,I]PERYLENE	1.40E-01 J	6.30E-01	1.25E-06	5.65E-06	mg/kg	PCSD04	PCSD04-000005	16 / 28	2.70E-01 - 5.30E-01	5.65E-06		N/A			NO	NTX
	207-08-9	BENZO[K]FLUORANTHENE	1.90E-01 J	1.30E+00 J	1.70E-06	1.17E-05	mg/kg	PCSD12	PCSD12_TOX00	19 / 28	2.70E-01 - 5.30E-01	1.17E-05		2.00E+00 c			NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	2.70E-01 J	3.30E-01 J	2.42E-06	2.96E-06	mg/kg	PCSD05	PCSD05-005020	4 / 28	2.70E-01 - 5.90E-01	2.96E-06		N/A			NO	NTX
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.80E-01 J	7.90E-01 J	1.61E-06	7.08E-06	mg/kg	PCSD09	PCSD09-005020	18 / 28	2.70E-01 - 4.80E-01	7.08E-06		5.10E+00 c			NO	BSL
	105-60-2	CAPROLACTAM	4.80E-01 J	4.80E-01 J	4.30E-06	4.30E-06	mg/kg	PCSD11	PCSD11-005020	1 / 28	5.20E-01 - 1.10E+00	4.30E-06		9.60E-01 n			NO	BSL
	86-74-8	CARBAZOLE	1.90E-01 J	3.80E-01 J	1.70E-06	3.41E-06	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	5.20E-01 - 1.10E+00	3.41E-06		N/A			NO	NTX
	218-01-9	CHRYSENE	2.70E-01 J	1.50E+00	2.42E-06	1.34E-05	mg/kg	PCSD12	PCSD12_TOX00	17 / 28	2.70E-01 - 5.30E-01	1.34E-05		2.00E+01 c			NO	BSL
	132-64-9	DIBENZOFURAN	7.80E-02 J	1.80E-01 J	6.99E-07	1.61E-06	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	1.61E-06		N/A			NO	NTX
	84-74-2	DI-N-BUTYL PHTHALATE	4.20E-01	1.60E+00	3.76E-06	1.43E-05	mg/kg	PCSD04	PCSD04-000005	3 / 28	2.70E-01 - 5.90E-01	1.43E-05		N/A			NO	NTX
	206-44-0	FLUORANTHENE	2.80E-01 J	4.00E+00	2.51E-06	3.59E-05	mg/kg	PCSD04	PCSD04-000005	21 / 28	5.20E-01 - 1.00E+00	3.59E-05		N/A			NO	NTX
	86-73-7	FLUORENE	1.80E-01 J	2.60E-01 J	1.68E-03	2.42E-03	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	2.42E-03		N/A			NO	NTX
	193-39-5	INDENO[1,2,3-CD]PYRENE	1.90E-01 J	5.50E-01	1.70E-06	4.93E-06	mg/kg	PCSD04	PCSD04-000005	11 / 28	2.70E-01 - 5.30E-01	4.93E-06		2.00E-01 c			NO	BSL
	91-20-3	NAPHTHALENE	5.10E-02 J	3.20E-01 J	2.88E-03	1.81E-02	mg/kg	PCSD02	PCSD02_TOX00	2 / 28	2.70E-01 - 5.40E-01	1.81E-02		3.60E-01 c			NO	BSL
	85-01-8	PHENANTHRENE	2.00E-01 J	3.20E+00	1.79E-06	2.87E-05	mg/kg	PCSD04	PCSD04-000005	8 / 28	2.70E-01 - 5.40E-01	2.87E-05		N/A			NO	NTX
	129-00-0	PYRENE	2.30E-01 J	3.80E+00	2.55E-04	4.21E-03	mg/kg	PCSD12	PCSD12_TOX00	20 / 28	2.70E-01 - 5.30E-01	4.21E-03		N/A			NO	NTX
	72-54-8	4,4'-DDD	6.70E-03	2.60E-02 J	6.01E-08	2.33E-07	mg/kg	PCSD09	PCSD09_TOX00	7 / 28	5.19E-03 - 1.06E-02	2.33E-07		1.80E-01 c			NO	BSL
	72-55-9	4,4'-DDE	1.10E-02	6.26E-02 J	9.86E-08	5.61E-07	mg/kg	PCSD09	PCSD09_TOX00	11 / 28	5.19E-03 - 1.02E-02	5.61E-07		1.30E-01 c			NO	BSL
	50-29-3	4,4'-DDT	6.30E-03 J	1.08E-01 J	5.65E-08	9.68E-07	mg/kg	PCSD09	PCSD09_TOX00	7 / 28	5.19E-03 - 1.06E-02	9.68E-07		1.30E-01 c			NO	BSL
	12789-03-6	CHLORDANE	1.89E-02	3.66E-02	3.25E-05	6.31E-05	mg/kg	PCSD04	PCSD04_TOX00	4 / 28	-	6.31E-05		1.20E-01 c			NO	BSL
	12672-29-6	AROCLOR-1248	5.60E-02 J	5.20E-01 J	2.35E-04	2.18E-03	mg/kg	PCSD04	PCSD04-005020	4 / 28	5.20E-02 - 1.10E-01	2.18E-03		2.10E-02 c			NO	BSL
	11097-69-1	AROCLOR-1254	1.90E-01 J	2.05E-01 J	5.92E-04	6.38E-04	mg/kg	PCSD04	PCSD04_TOX00	3 / 28	5.20E-02 - 1.10E-01	6.38E-04		2.10E-02 c			NO	BSL
	11096-82-5	AROCLOR-1260	1.00E-02 J	1.85E-01	2.00E-05	3.70E-04	mg/kg	PCSD04	PCSD04_TOX00	24 / 28	5.20E-02 - 7.40E-02	3.70E-04		2.10E-02 c			NO	BSL
	11100-14-4	AROCLOR-1268	4.40E-02 J	1.20E-01 J	8.80E-05	2.40E-04	mg/kg	PCSD09	PCSD09-005020	3 / 28	5.20E-02 - 1.10E-01	2.40E-04		2.10E-02 c			NO	BSL
	NA	TEQ for PCB Congeners [7]	5.29E-06	9.62E-05	7.10E-09	1.29E-07	mg/kg	PCSD04	PCSD04-000005	4 / 4	N/A	1.29E-07		3.20E-07 c			NO	BSL
	NA	High Risk PCBs [8]	1.43E-01	2.25E+00	7.04E-04	1.11E-02	mg/kg	PCSD04	PCSD04-000005	4 / 4	N/A	1.11E-02		2.10E-02 c			NO	BSL
	NA	2,3,7,8-TCDD TEQ [9]	6.07E-07	5.41E-05	8.16E-10	7.26E-08	mg/kg	PCSD04	PCSD04_TOX00	16 / 16	N/A	7.26E-08		3.20E-07 c			NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	2.80E+03	2.00E+04	2.51E-02	1.79E-01	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	1.79E-01		2.20E+00 n			NO	BSL
	7440-36-0	ANTIMONY	6.70E-01 J	6.70E-01 J	6.01E-06	6.01E-06	mg/kg	PCSD01	PCSD01-005020	1 / 28	6.40E+00 - 1.65E+01	6.01E-06		N/A			NO	NTX
	7440-38-2	ARSENIC	2.50E+00	2.21E+01 J	2.24E-05	1.98E-04	mg/kg	PCSD05	PCSD05-000005	28 / 28	N/A	1.98E-04		2.90E-03 c			NO	BSL
	7440-39-3	BARIUM	1.48E+01 J	9.79E+01	1.33E-04	8.77E-04	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	8.77E-04		2.20E-01 n			NO	BSL
	7440-41-7	BERYLLIUM	1.90E-01 J	2.20E+00	1.70E-06	1.97E-05	mg/kg	PCSD04	PCSD04-005020	28 / 28	N/A	1.97E-05		5.10E-03 c			NO	BSL
	7440-43-9	CADMIUM	3.50E-01 J	4.05E+00	3.14E-06	3.63E-05	mg/kg	PCSD07	PCSD07-005020	27 / 28	1.40E+00 - 1.40E+00	3.63E-05		4.40E-03 n			NO	BSL
	7440-70-2	CALCIUM METAL	6.37E+02	3.34E+04	5.71E-03	2.99E-01	mg/kg	PCSD06	PCSD06-000005	28 / 28	N/A	2.99E-01		N/A			NO	NUT
	7440-47-3	CHROMIUM[6]	1.21E+01	1.11E+03	1.08E-04	9.95E-03	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	9.95E-03		N/A			NO	NTX
	7440-47-3	**CHROMIUM[6]**	**1.21E+01**	**1.11E+03**	**1.08E-04**	**9.95E-03**	**mg/kg**	**PCSD04**	**PCSD04-000005**	**28 / 28**	**N/A**	**9.95E-03**		**1.50E-04 c**			**YES**	**ASL**
	18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	9.90E-01	2.18E+00	8.87E-06	1.95E-05	mg/kg	PCSD05	PCSD05-005020	2 / 12	5.90E-01 - 1.21E+00	1.95E-05		1.50E-04 c			NO	BSL
	7440-48-4	**COBALT**	**4.50E-01 J**	**6.12E+02**	**4.03E-06**	**5.49E-03**	**mg/kg**	**PCSD04**	**PCSD04-000005**	**28 / 28**	**N/A**	**5.49E-03**		**1.40E-03 c**			**YES**	**ASL**
	7440-50-8	COPPER	3.06E+01	3.98E+02	2.74E-04	3.57E-03	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	3.57E-03		N/A			NO	NTX
	57-12-5	CYANIDE	1.00E+00 J	1.00E+00 J	8.96E-06	8.96E-06	mg/kg	PCSD10	PCSD10-005020	1 / 24	6.80E-01 - 1.50E+00	8.96E-06		3.50E-01 n			NO	BSL
	7439-89-6	IRON	7.43E+03	3.93E+04	6.66E-02	3.52E-01	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	3.52E-01		N/A			NO	NTX
	7439-92-1	LEAD	6.04E+01	3.02E+02	5.41E-04	2.71E-03	mg/kg	PCSD04	PCSD04-005020	28 / 28	N/A	2.71E-03		N/A			NO	NTX
	7439-95-4	MAGNESIUM	1.04E+03	6.93E+03	9.32E-03	6.21E-02	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	6.21E-02		N/A			NO	NUT
	7439-96-5	MANGANESE	5.79E+01	3.45E+02	5.19E-04	3.09E-03	mg/kg	PCSD10	PCSD10-005020	28 / 28	N/A	3.09E-03		2.20E-02 n			NO	BSL
	7439-97-6	**MERCURY**	**1.50E-01**	**1.50E+00**	**7.58E-02**	**7.58E-01**	**mg/kg**	**PCSD05**	**PCSD05-005020**	**28 / 28**	**N/A**	**7.58E-01**		**1.30E-01 n**			**YES**	**ASL**
	7440-02-0	NICKEL	5.30E+00	9.42E+02	4.75E-05	8.44E-03	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	8.44E-03		3.90E-02 n			NO	BSL

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Minimum Estimated Air Concentration	Maximum Estimated Air Concentration	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-09-7	POTASSIUM	7.87E+02	4.20E+03	7.05E-03	3.76E-02	mg/kg	PCSD06	PCSD06-005020	28 / 28	N/A	3.76E-02		N/A			NO	NUT
	7440-22-4	SILVER	6.40E-01 J	3.30E+00	5.74E-06	2.96E-05	mg/kg	PCSD07	PCSD07-005020	24 / 28	1.80E+00 - 2.80E+00	2.96E-05		N/A			NO	NTX
	7440-23-5	SODIUM	1.62E+03 J	1.16E+04	1.45E-02	1.04E-01	mg/kg	PCSD08	PCSD08-000005	28 / 28	N/A	1.04E-01		N/A			NO	NUT
	7440-28-0	THALLIUM	3.10E-01 J-	2.00E+00 J	2.78E-06	1.79E-05	mg/kg	PCSD12	PCSD12-005020	20 / 28	3.50E+00 - 6.90E+00	1.79E-05		N/A			NO	NTX
	7440-62-2	VANADIUM (FUME OR DUST)	1.01E+01	5.53E+01	9.05E-05	4.96E-04	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	4.96E-04		4.40E-02 n			NO	BSL
	7440-66-6	ZINC	6.14E+01	1.48E+03	5.50E-04	1.33E-02	mg/kg	PCSD04	PCSD04-000005	28 / 28	N/A	1.33E-02		N/A			NO	NTX
	14913-49-6	BISMUTH-212	4.39E-01 J	1.58E+00 J	3.93E-06	1.42E-05	pCi/g	PCSD08	PCSD08-005020	24 / 24	N/A	1.42E-05		5.45E-02 c			NO	BSL
	14733-03-0	BISMUTH-214	2.95E-01 J	9.08E-01 J	2.64E-06	8.14E-06	pCi/g	PCSD04	PCSD04-000005	24 / 24	N/A	8.14E-06		2.01E-04 c			NO	BSL
	10045-97-3	CESIUM-137	1.54E-02	4.67E-01	1.38E-07	4.19E-06	pCi/g	PCSD05	PCSD05-000005	22 / 22	N/A	4.19E-06		5.50E-02 c			NO	BSL
	15092-94-1	LEAD-212	3.75E-01 J	1.23E+00 J	3.36E-06	1.10E-05	pCi/g	PCSD08	PCSD08-005020	24 / 24	N/A	1.10E-05		8.36E-03 c			NO	BSL
	15067-28-4	LEAD-214	3.42E-01 J	1.04E+00 J	3.07E-06	9.36E-06	pCi/g	PCSD04	PCSD04-005020	24 / 24	N/A	9.36E-06		2.01E-04 c			NO	BSL
	13966-00-2	POTASSIUM-40	6.43E+00	1.88E+01	5.76E-05	1.69E-04	pCi/g	PCSD08	PCSD08-005020	24 / 24	N/A	1.69E-04		2.80E-02 c			NO	BSL
	15262-20-1	RADIUM-228	3.94E-01	1.38E+00	3.53E-06	1.24E-05	pCi/g	PCSD08	PCSD08-005020	24 / 24	N/A	1.24E-05		3.30E-05 c			NO	BSL
	10098-97-2	STRONTIUM-90	4.81E-01	4.81E-01	4.31E-06	4.31E-06	pCi/g	PCSD10	PCSD10-000005	1 / 24	2.38E-01 - 3.75E-01	4.31E-06		1.43E-02 c			NO	BSL
	14913-50-9	THALLIUM-208	1.18E-01 J	4.14E-01 J	1.06E-06	3.71E-06	pCi/g	PCSD08	PCSD08-005020	24 / 24	N/A	3.71E-06		2.53E+00 c			NO	BSL
	15117-96-1	URANIUM-235	6.67E-02 J	1.64E-01 J	5.98E-07	1.47E-06	pCi/g	PCSD08	PCSD08-000005	10 / 11	1.07E-01 - 1.07E-01	1.47E-06		1.98E-05 c			NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for industrial air (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for pyrene used for benzo(g,h,i)perylene and phenanthrene
RSL value for Aroclor-1260 used for Aroclor-1268
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 1 km^2 with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
Deletion Reason:	Below Screening Level (BSL)
	No Screening Value (NTX)
	Essential Nutrient (NUT)

[6] Chromium screened against both trivalent and hexavalent chromium RSLs.
[7] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
µg/m^3 = micrograms per cubic meter
N/A = Not available
pCi/m^3 = picocuries per cubic meter

Air concentration = soil concentration x (1/PEF + 1/VF)

PEF = particulate emission factor; VF = volatilization factor

PEF for construction worker = 1.1 x 10^8 m^3/kg (Calculated using equations 5-5 and 5-6 from EPA, 2002, see Table 2.13a).

VF calculated in Table 2.13b using equations from EPA, 2002.

PEF and VF calculations based on assumed maximum area of exposed trench that would be open at a given time during a utility worker project, estimated to be 100 linear feet of a 16 feet wide trench.

Table 2.13a
Calculation of Construction Worker Exposure Scenario PEF

Construction Scenario PEF (m^3/kg) (Lowest of Excavation Activities and Wind PEF and Contribution from Traffic on Unpaved Road PEF) = 1.12E+08

Traffic on Unpaved Road PEF

$$PEF_{SC} = {}^{Q}/_{C_{Sr}} \times \frac{1}{F_D} \times \frac{T \times A_R}{556 \times ({}^{W}/_{3})^{0.4} \times \left(\frac{365\ d/yr - p}{365\ d/yr}\right) \times \Sigma VKT}$$

Equation 5-5 from EPA, 2002

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

Equation 5-6 from EPA, 2002

$$F_D = 0.1852 + \frac{5.3537}{t_c} + \frac{-9.6318}{t_c^2}$$

Equation E-16 from Appendix E of EPA, 2002

Variable	Value	Units	Definition	Source
A	12.9	unitless	Constant	Default
B	5.74	unitless	Constant	Default
C	71.8	unitless	Constant	Default
T	31,500,000	seconds	Total time over which construction occurs	Assumed
AR	74	m2	Surface area of contaminated road segment	Calculated, site-specific (square root of site surface contamination configured as a square x default width of road segment of 20 ft)
s	8.50	%	Road surface silt content	Default
W	11	tons	Mean weight of vehicle	Assumed (5 x 2-ton and 5 x 20-ton trucks per day)
Mdry	0.2	%	Road surface material moisture content under dry, uncontrolled conditions	Default
p	120	days	Number of days with at least 0.01 inches of precipitation	Lookup value (Exhibit 5-2 from EPA, 2002)
# days/truck	260	days		Assumed (5 days per week for 52 weeks)
SVKT	63	km	Sum of fleet vehicle kilometers traveled during the exposure duration	Assumed (3 vehicles x 0.045 km/day x 250 days)
LR	40	feet	Road length	Assumed (square root of the area)
WR	20	feet	Road width	Assumed
As	0.0367	acres	Areal extent of site (or site contamination)	Site-specific
tc	8,760	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.186	unitless	Dispersion correction factor	Calculated (Equation E-16 from Appendix E of EPA, 2002)
Q/Csr	40.4	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the emission flux along a straight road segment bisecting a square site	Calculated (Equation 5-6 from EPA, 2002)
PEF		m3/kg	Subchronic road particular emission factor	Calculated

Excavation Activities and Wind PEF

Site Assumptions

Variable	Value	Units	Source
Site Area	0.0367	acres	Site-specific
Site Area	1,599	square feet	Calculated, site-specific
Site Area	149	square meters	Calculated, site-specific
Site length	40	feet, assumed to be a square	Calculated, site-specific
# passes	6	# passes to cover entire site	Calculated, site-specific

Wind Erosion (Equation E-20 from Appendix E of EPA, 2002)

$$M_{wind} = 0.036 \times (1 - V) \times \left(\frac{U_m}{U_t}\right)^3 \times F(x) \times A_{surf} \times ED \times 8{,}760\ hr/yr$$

Variable	Value	Units	Definition	Source
V	0	unitless	Fraction of vegetative cover	Default
Um	4.69	m/s	Mean annual windspeed	Default
Ut	11.3	m/s	Equivalent threshold value of windspeed at 7m	Default
F(x)	0.194	unitless	Function dependent on Um/Ut derived	Default
Asurf	149	m2	Areal extent of site with undisturbed surface soil contamination	Site-specific, calculated
ED	0.054794521	year	Exposure duration	Assumed (20-day duration)
Mwind	35	g	Unit mass emitted from wind erosion	Calculated

Excavation Emissions (Equation E-21 from Appendix E of EPA, 2002)

$$M_{excav} = 0.35 \times 0.0016 \times \frac{\left(\frac{U_m}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \times \rho_{soil} \times A_{excav} \times D_{excav} \times N_A \times 10^3\ g/kg$$

Variable	Value	Units	Definition	Source
Um	4.69	m/s	Mean windspeed during construction	Default
M	12	%	Gravimetric soil moisture content	Default
Psoil	1.68	Mg/m3	In-situ soil density	Default
Aexcav	149	m2	Areal extent of excavation	Assumed (all of the trench area is graded)
dexcav	3.03030303	m	Average depth of excavation	Assumed (10-foot excavation)
NA	2	unitless	Number of times soil is dumped	Default
Mexcav	184.4943507	g	Unit mass emitted from excavation	Calculated

Table 2.13a
Calculation of Construction Worker Exposure Scenario PEF

Dozing Emissions (Equation E-22 from Appendix E of EPA, 2002)

$$M_{doz} = 0.75 \times \frac{0.45(s)^{1.5}}{(M)^{1.4}} \times \frac{\Sigma VKT}{S} \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
s	6.9	%	Soil silt content	Default
M	7.9	%	Gravimetric soil moisture content	Default
SVKT	0.15	km	Sum of dozing kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
S	11.4	kph	Average dozing speed	Default
Mdoz	4.346593279	g	Unit mass emitted from dozing operations	Calculated

Grading Emissions (Equation E-23 from Appendix E of EPA, 2002)

$$M_{grade} = 0.60 \times 0.0056(S)^{2.0} \times \Sigma VKT \times 10^3 g/kg$$

Variable	Value	Units	Definition	Source
S	11.4	kph	Average grading speed	Default
SVKT	0.15	km	Sum of grading kilometers traveled	Calculated (assume entire site is graded twice and each pass is 8 feet in width)
Mgrade	63.87535842	g	Unit mass emitted from grading operations	Calculated

Tilling Emissions (Equation E-24 from Appendix E of EPA, 2002)

$$M_{till} = 1.1(s)^{0.6} \times A_{till} \times 4{,}047\, m^2/acre \times 10^{-4}\, ha/m^2 \times 10^3 g/kg \times N_A$$

Variable	Value	Units	Definition	Source
s	18	%	Soil silt content	Default
Atill	0.01835	acre	Areal extent of tilling	Calculated (assume one-half the site is tilled for re-vegetation)
NA	2	unitless	Number of times soil is tilled	Default
Mtill	0	g	Unit mass emitted from tilling or similar operations	Assumed no tilling takes place for trenching

Table 2.13a
Calculation of Construction Worker Exposure Scenario PEF

<J'T> - unit emission flux (Equation E-25 from Appendix E of EPA, 2002)

$$< J_T^{\cdot\cdot} >= \frac{M_{wind} + M_{ecav} + M_{doz} + M_{grade} + M_{till}}{A_c \times T}$$

Variable	Value	Units	Definition	Source
Ac	148.595702	m2	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
T	1728000	s	Duration of construction	Assumed (20-day duration)
<J'T>	1.12217E-06	g/m2-s	Total time-averaged unit emission flux for construction activities other than traffic on unpaved road	

PEF'sc (Equation E-26 from Appendix E of EPA, 2002)

$$PEF_{sc}^{\cdot\cdot} = Q/C_{sa} \times \frac{1}{F_D} \times \frac{1}{< J_T^{\cdot\cdot} >}$$

Variable	Value	Units	Definition	Source
Ac	0.0367	acres	Areal extent of site soil contamination	Calculated, site-specific (contamination assumed to cover whole site)
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration and the emission flux at the center of the square emission source	Calculated (equation E-15 from Appendix E of EPA, 2002)
tc	480	hours	Duration of construction (250 days for 8 hr/day)	Assumed
FD	0.196311737	unitless	Dispersion correction factor	Calculated (equation E-16 from Appendix E of EPA, 2002)
PEF'sc	1.12E+08	m3/kg	Subchronic particulate emission factor for construction activities other than traffic on unpaved roads	

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

Table 2.13b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario

Chemical		Diffusivity in Air (Di) (cm2/s)	Henry's Law Constant (H') (unitless)	Diffusivity in Water (Dw) (cm2/s)	Soil Organic Carbon Partition Coeff. (Koc) (cm3/g)	Soil Water Partition Coeff. (Kd = Koc x Foc) (g/cm3)	Solubility in Water (S) (mg/L)	Apparent Diffusivity (DA) (cm2/s)	Volatilization Factor (VF) (m3/kg)
Volatile Organics									
2-Butanone (Methyl ethyl ketone)	78-93-3	9.14E-02	2.33E-03	1.02E-05	4.51E+00	2.71E-02	2.23E+05	8.94E-05	4.66E+03
Acetone	67-64-1	1.06E-01	1.43E-03	1.15E-05	2.36E+00	1.42E-02	1.00E+06	7.1E-05	5.2E+03
Carbon Disulfide	75-15-0	1.06E-01	5.89E-01	1.30E-05	2.17E+01	1.30E-01	2.16E+03	9.8E-03	4.5E+02
Methyl acetate	79-20-9	9.58E-02	4.70E-03	1.10E-05	3.06E+00	1.84E-02	2.43E+05	2.0E-04	3.1E+03
Methylene chloride	75-09-2	1.0E-01	1.3E-01	1.3E-05	2.2E+01	1.30E-01	1.3E+04	2.8E-03	8.4E+02
2-Methylnaphthalene	91-57-6	5.2E-02	2.1E-02	7.8E-06	2.5E+03	1.49E+01	2.5E+01	4.0E-06	2.2E+04
Acenaphthene	83-32-9	5.1E-02	7.5E-03	8.3E-06	5.0E+03	3.02E+01	3.9E+00	6.7E-07	5.4E+04
Acetophenone	98-86-2	6.5E-02	4.3E-04	8.7E-06	5.2E+01	3.11E-01	6.1E+03	3.7E-06	2.3E+04
Anthracene	120-12-7	3.9E-02	2.3E-03	7.9E-06	1.6E+04	9.82E+01	4.3E-02	4.9E-08	2.0E+05
Benzo(a)anthracene	56-55-3	2.61E-02	4.91E-04	6.75E-06	1.77E+05	1.06E+03	9.40E-03	6.8E-10	1.7E+06
Biphenyl	92-52-4	4.70E-02	1.26E-02	7.60E-06	5.10E+03	3.06E+01	4.00E+00	1.0E-06	1.5E+04
Dibenzofuran	132-64-9	6.51E-02	8.71E-03	7.38E-06	9.16E+03	5.50E+01	3.10E+00	5.5E-07	5.9E+04
Fluorene	86-73-7	4.4E-02	3.9E-03	7.9E-06	9.2E+03	5.50E+01	1.7E+00	1.7E-07	1.1E+05
Naphthalene	91-20-3	6.0E-02	1.8E-02	8.4E-06	1.5E+03	9.26E+00	3.1E+01	6.2E-06	1.8E+04
Pyrene	129-00-0	2.8E-02	4.9E-04	7.2E-06	5.4E+04	3.26E+02	1.4E-01	2.3E-09	9.1E+05
4,4'-DDE	72-55-9	2.3E-02	1.7E-03	5.9E-06	1.2E+05	7.05E+02	4.0E-02	3.0E-09	8.0E+05
Aldrin	309-00-2	2.3E-02	1.8E-03	5.8E-06	8.2E+04	4.92E+02	1.7E-02	4.5E-09	6.6E+05
Chlordane	12789-03-6	2.1E-02	2.0E-03	5.4E-06	6.8E+04	4.05E+02	5.6E-02	5.7E-09	5.8E+05
Heptachlor	76-44-8	2.2E-02	1.2E-02	5.7E-06	4.1E+04	2.48E+02	1.8E-01	5.8E-08	1.8E+05
Aroclor-1248	12672-29-6	1.63E-02	1.80E-02	3.94E-06	7.65E+04	4.59E+02	1.00E-01	3.4E-08	2.4E+05
Aroclor-1254	11097-69-1	2.37E-02	1.16E-02	6.10E-06	1.31E+05	7.83E+02	4.30E-02	1.9E-08	3.2E+05
Aroclor-1260	11096-82-5	2.20E-02	1.37E-02	5.61E-06	3.50E+05	2.10E+03	1.44E-02	7.7E-09	5.0E+05
2,3,3',4,4',5,5'-Heptachlorobiphenyl	39635-31-9	4.24E-02	2.07E-03	5.69E-06	3.50E+05	2.10E+03	7.53E-04	2.3E-09	9.3E+05
2,3,3',4,4'-Pentachlorobiphenyl	32598-14-4	4.67E-02	1.16E-02	6.06E-06	1.31E+05	7.83E+02	3.40E-03	3.7E-08	2.3E+05
2,3',4,4',5,5'-Hexachlorobiphenyl	52663-72-6	4.44E-02	2.80E-03	5.86E-06	2.09E+05	1.26E+03	2.23E-03	5.3E-09	6.0E+05
2,3,4,4',5-Pentachlorobiphenyl	74472-37-0	4.67E-02	3.78E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	1.2E-08	4.0E+05
2',3,4,4',5-Pentachlorobiphenyl	65510-44-3	4.67E-02	7.77E-03	6.06E-06	1.31E+05	7.83E+02	1.60E-02	2.5E-08	2.8E+05
2,3',4,4',5-Pentachlorobiphenyl	31508-00-6	4.67E-02	1.18E-02	6.06E-06	1.28E+05	7.67E+02	1.34E-02	3.8E-08	2.3E+05
3,3',4,4',5-Pentachlorobiphenyl	57465-28-8	4.67E-02	7.77E-03	6.06E-06	1.28E+05	7.67E+02	7.33E-03	2.5E-08	2.8E+05
3,4,4',5-Tetrachlorobiphenyl	70362-50-4	4.94E-02	9.12E-03	6.27E-06	7.81E+04	4.69E+02	3.22E-02	5.1E-08	1.9E+05
2,3,7,8-TCDD	1746-01-6	4.70E-02	2.04E-03	6.76E-06	2.49E+05	1.49E+03	2.00E-04	3.5E-09	7.5E+05
Polychlorinated Biphenyls (high risk)	NA	2.43E-02	1.70E-02	6.27E-06	7.81E+04	4.69E+02	7.00E-01	4.7E-08	2.0E+05
Mercury	7439-97-6	3.10E-02	3.50E-01	6.30E-06	NA	1.00E+00	6.00E-02	5.0E-04	2.0E+03

Table 2.13b
Occurrence, Distribution and Selection of Chemicals of Potential Concern
Calculation of Chemical Specific VF Factors - Excavation Scenario

Volatilization factor (VF) (m^3/kg)
Equation 5-14 of EPA, 2002

$$VF_{sc} = \left[\frac{(3.14 \times D_A \times T)^{1/2}}{2 \times \rho_b \times D_A}\right] \times 10^{-4}\, m^2/cm^2 \times Q/C_{sa} \times \frac{1}{F_D}$$

Apparent Diffusivity (DA) (cm^2/s)
Equation 5-14 of EPA, 2002

$$D_A = \frac{\left[\left(\theta_a^{10/3} D_i H' + \theta_w^{10/3} D_w\right)/n^2\right]}{\rho_b K_d + \theta_w + \theta_a H'}$$

Variable	Value	Unit	Definition	Source
Q/C =	132.8562746	g/m^2-s per kg/m^3	Q/Csa * (1/Fd)	Intermediate calculation
Fd	0.185	unitless	Dispersion correction factor	Default
Qa	0.28	Lair/Lwater	Air-filled soil porosity	n - Qw (Equation 5-14 of EPA, 2002)
n	0.43	Lpore/Lsoil	Total soil porosity	1 - (rb/rs) (Equation 5-14 of EPA, 2002)
Qw	0.15	Lwater/Lsoil	Water-filled soil porosity	Default
rs	2.65	g/cm^3	Soil particle density	Default
rb	1.5	g/cm^3	Dry soil bulk density	Default
T	3.154E+07	seconds	Total time over which construction occurs	Calculated (1-year duration)
foc	0.006	g/g	Fraction organic carbon in soil	Default
A	2.4538	unitless	Constant	Default
Ac	0.0367	acres	Areal extent of soil contamination	Site-specific
B	17.566	unitless	Constant	Default
C	189.0426	unitless	Constant	Default
Q/Csa	24.57841081	g/m^2-s per kg/m^3	Inverse of the ratio of the 1-h geometric mean air concentration to the volatilzation flux at the center of a square site	Calculated (Equation 5-15 of EPA, 2002)

Chemical and physical properties from parameter table for Regional Screening Levels, June 2017.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. December.

Table 2.14
Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration	Qualifier	Maximum [1] Concentration	Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening Toxicity Value			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [7] Contaminant Deletion or Selection
Paradise Creek																				
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	8.00E+00		8.00E+00		ug/L	PCSW08	PCSW08	1 / 12	5.00E+00 - 5.00E+00	8.00E+00	N/A	1.20E+01		[6]	N/A		NO	BSL
	84-74-2	DI-N-BUTYL PHTHALATE	2.70E+00	J	2.70E+00	J	ug/L	PCSW08	PCSW08	1 / 12	5.00E+00 - 5.00E+00	2.70E+00	N/A	9.00E+02	n	[4]	N/A		NO	BSL
	NA	TEQ for PCB Congeners [8]	3.34E-09		5.27E-09		ug/L	PCSW06	PCSW06	5 / 5	N/A	5.27E-09	N/A	5.00E-08		[6]	N/A		NO	BSL
	NA	**High Risk PCBs [9]**	**1.16E-03**		**2.24E-03**		**ug/L**	**PCSW06**	**PCSW06**	**5 / 5**	N/A	**2.24E-03**	**N/A**	**N/A**			**N/A**		**YES**	**TOX [10]**
	NA	**2,3,7,8-TCDD TEQ [11]**	**1.24E-07**		**8.14E-07**		**ug/L**	**PCSW04**	**PCSW04**	**3 / 3**	N/A	**8.14E-07**	**N/A**	**5.00E-08**		**[6]**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM	1.37E+02	J	5.24E+02		ug/L	PCSW05	PCSW05	12 / 12	N/A	5.24E+02	N/A	2.00E+04	n	[4]	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**2.20E+00**	**J**	**5.70E+00**	**J**	**ug/L**	**PCSW09**	**PCSW09**	**5 / 12**	**1.00E+01 - 1.00E+01**	**5.70E+00**	**N/A**	**5.20E-01**	**c**	**[4]**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	2.04E+01	J	4.97E+01	J	ug/L	PCSW04	PCSW04	12 / 12	N/A	4.97E+01	N/A	2.00E+03		[6]	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	1.64E+05		2.02E+05		ug/L	PCSW12; PCSW11	PCSW12; PCSW11	12 / 12	N/A	2.02E+05	N/A	N/A			N/A		NO	NUT
	7440-47-3	**CHROMIUM**	**1.10E+00**	**J**	**3.85E+00**	**J**	**ug/L**	**PCSW07**	**PCSW07**	**11 / 12**	**1.00E+01 - 1.00E+01**	**3.85E+00**	**N/A**	**3.50E-01**	**c**	**[5]**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	3.70E+00	J	5.60E+00	J	ug/L	PCSW05	PCSW05	9 / 12	2.50E+01 - 2.50E+01	5.60E+00	N/A	8.00E+02	n	[4]	N/A		NO	BSL
	7439-89-6	**IRON**	**3.35E+02**	**J**	**9.63E+02**	**J**	**ug/L**	**PCSW04**	**PCSW04**	**12 / 12**	**N/A**	**9.63E+02**	**N/A**	**3.00E+02**		**[6]**	**N/A**		**YES**	**ASL**
	7439-92-1	LEAD	2.60E+00	J	3.65E+00	J	ug/L	PCSW07	PCSW07	5 / 12	1.00E+01 - 1.00E+01	3.65E+00	N/A	1.50E+01		[6]	N/A		NO	BSL
	7439-95-4	MAGNESIUM	4.68E+05		6.17E+05		ug/L	PCSW12; PCSW11	PCSW12; PCSW11	12 / 12	N/A	6.17E+05	N/A	N/A			N/A		NO	NUT
	7439-96-5	MANGANESE	7.62E+01		1.20E+02		ug/L	PCSW04	PCSW04	12 / 12	N/A	1.20E+02	N/A	4.30E+02	n	[4]	N/A		NO	BSL
	7440-02-0	NICKEL	2.90E+00	J	1.48E+01	J	ug/L	PCSW07	PCSW07	11 / 12	4.00E+01 - 4.00E+01	1.48E+01	N/A	3.90E+02	n	[4]	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.62E+05		2.15E+05		ug/L	PCSW12; PCSW11	PCSW12; PCSW11	12 / 12	N/A	2.15E+05	N/A	N/A			N/A		NO	NUT
	7782-49-2	SELENIUM	4.20E+00	J	5.00E+00	J	ug/L	PCSW09	PCSW09	2 / 12	3.50E+01 - 3.50E+01	5.00E+00	N/A	1.00E+02	n	[4]	N/A		NO	BSL
	7440-23-5	SODIUM	3.96E+06		5.12E+06		ug/L	PCSW11	PCSW11	12 / 12	N/A	5.12E+06	N/A	N/A			N/A		NO	NUT
	7440-28-0	**THALLIUM**	**2.00E+00**	**J**	**3.80E+00**	**J**	**ug/L**	**PCSW12**	**PCSW12**	**8 / 12**	**2.50E+01 - 2.50E+01**	**3.80E+00**	**N/A**	**2.00E-01**	**n**	**[4]**	**N/A**		**YES**	**ASL**
	7440-62-2	VANADIUM (FUME OR DUST)	5.90E+00	J	7.20E+00	J	ug/L	PCSW07	PCSW07	3 / 12	5.00E+01 - 5.00E+01	7.20E+00	N/A	8.60E+01	n	[4]	N/A		NO	BSL
	7440-66-6	ZINC	1.27E+01	J	7.26E+01		ug/L	PCSW08	PCSW08	7 / 12	6.00E+01 - 6.00E+01	7.26E+01	N/A	6.00E+03	n	[4]	N/A		NO	BSL
	13966-00-2	**POTASSIUM-40**	**9.97E+01**		**1.94E+02**		**pCi/L**	**PCSW12**	**PCSW12**	**12 / 12**	**N/A**	**1.94E+02**	**N/A**	**2.12E+01**	**c**	**[4]**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Level (RSL) for tapwater (November 2017) (cancer risk = 1E-05, non-cancer HQ = 1.0)
RSL value for xylenes used for m,p-xylene.
Radiological PRGs were calculated using the ORNL PRG calculator. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

[5] Chromium concentrations screened against hexavalent chromium 10x EPA tap water RSL.

[6] Code of Virginia, Water Quality Standards; Public Water Supply (96VAC25-260-140).

[7] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

[8] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[9] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[10] Identified as a COPC based on available toxicological data.

[11] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
ug/L = micrograms per liter
N/A = Not available
pCi/L = picocuries per liter

Table 2.15
Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future	
Medium: Paradise Creek Fish	
Exposure Medium: Fish	

Exposure Point	CAS Number	Chemical	Minimum Detected Concentration (Mummichog Tissue)		Maximum Detected Concentration (Mummichog Tissue)		Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Bioaccumulative Chemical?	Maximum Paradise Creek Sediment Result (mg/kg or pCi/g)	Maximum Paradise Creek Surface Water Result (µg/L or pCi/L)	Biota-Sediment Accumulation Factor[1]	Bioconcentration Factor[2] (L-sw/kg-fish)	Estimated Fish Tissue Concentration from Sediment and Surface Water (mg/kg or pCi/g) [3]	Tissue Concentration Used for Screening (mg/kg or pCi/g) [4]	Screening Toxicity Value [5] (mg/kg or pCi/g)		COPC Flag	Rationale for Contaminant Deletion or Selection [6]
Paradise Creek																					
	72-54-8	**4,4'-DDD**	**2.70E-03**	**J**	**4.30E-03**	**J**	**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**Yes**	**2.60E-02**	**ND**	**2.36E+00**	**4.36E+03**	**1.30E-02**	**1.30E-02**	**5.96E-03**	**c**	**YES**	**ASL**
	72-55-9	**4,4'-DDE**	**7.10E-03**	**J**	**9.40E-03**	**J**	**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**Yes**	**6.26E-02**	**ND**	**5.28E+00**	**1.20E+04**	**7.01E-02**	**7.01E-02**	**2.04E-02**	**c**	**YES**	**ASL**
	50-29-3	**4,4'-DDT**	**3.50E-03**	**J**	**5.20E-03**	**J**	**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**Yes**	**1.08E-01**	**ND**	**6.09E+00**	**1.96E+04**	**1.39E-01**	**1.39E-01**	**2.04E-02**	**c**	**YES**	**ASL**
	12789-03-6	**CHLORDANE**	**1.10E-03**	**J**	**1.30E-03**	**J**	**mg/kg**	**PCSD09**	**PCSD09-BTCF**	**3 / 4**	**Yes**	**3.66E-02**	**ND**	**1.01E+01**	**2.68E+04**	**7.81E-02**	**7.81E-02**	**1.99E-02**	**c**	**YES**	**ASL**
	60-57-1	**DIELDRIN**	**1.40E-03**	**J**	**2.30E-03**	**J**	**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**Yes**	**ND**	**ND**	**1.06E+02**	**7.48E+03**	**N/A**	**2.30E-03**	**4.35E-04**	**c**	**YES**	**ASL**
	53494-70-5	ENDRIN KETONE	2.40E-03	J	2.40E-03	J	mg/kg	PCSD12	PCSD12-BTCF	1 / 4	Yes	ND	ND	1.00E+00	N/A	N/A	2.40E-03	5.96E-02	n	NO	BSL
	11097-69-1	**AROCLOR-1254**	**1.20E-02**	**J**	**1.90E-02**	**J**	**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**Yes**	**2.05E-01**	**ND**	**1.85E+00**	**2.00E+06**	**8.03E-02**	**8.03E-02**	**3.48E-03**	**c**	**YES**	**ASL**
	NA	**TEQ for PCB Congeners [7]**	**1.40E-06**		**2.82E-06**		**mg/kg**	**PCSD02**	**PCSD02-BTCF**	**4 / 4**	**Yes**	**9.62E-05**	**5.27E-09**	**2.50E-02**	**2.53E+04**	**5.09E-07**	**2.82E-06**	**1.05E-07**	**c**	**YES**	**ASL**
	NA	**High Risk PCBs [8]**	**7.92E-02**		**1.13E-01**		**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**Yes**	**2.25E+00**	**2.24E-03**	**1.85E+00**	**2.53E+04**	**8.84E-01**	**8.84E-01**	**6.80E-03**	**c**	**YES**	**ASL**
	NA	**2,3,7,8-TCDD TEQ [9]**	**6.95E-08**		**7.75E-07**		**mg/kg**	**PCSD02**	**PCSD02-BTCF**	**4 / 4**	**Yes**	**5.41E-05**	**8.14E-07**	**2.50E-02**	**9.70E+04**	**7.89E-05**	**7.89E-05**	**1.05E-07**	**c**	**YES**	**ASL**
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**3.33E+01**		**2.63E+02**		**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**No**	**2.00E+04**	**5.24E+02**	**N/A**	**5.00E+02**	**2.62E+02**	**2.63E+02**	**1.99E+02**	**n**	**YES**	**BSL**
	7440-38-2	**ARSENIC**	**2.50E-01**	**J**	**3.40E-01**	**J**	**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**Yes**	**2.21E+01**	**5.70E+00**	**1.20E-01**	**3.00E+02**	**1.71E+00**	**1.71E+00**	**4.63E-03**	**c**	**YES**	**ASL**
	7440-39-3	BARIUM	2.80E+00	J	5.70E+00		mg/kg	PCSD02	PCSD02-BTCF	4 / 4	No	9.79E+01	4.97E+01	N/A	4.00E+00	**1.99E-01**	5.70E+00	3.97E+01	n	NO	BSL
	7440-70-2	CALCIUM METAL	4.40E+02		1.60E+04		mg/kg	PCSD12	PCSD12-BTCF	4 / 4	No	3.34E+04	2.02E+05	N/A	N/A	N/A	1.60E+04	N/A		NO	NUT
	7440-47-3	CHROMIUM	5.05E-01	J	6.20E-01	J	mg/kg	PCSD12	PCSD12-BTCF	4 / 4	No	1.11E+03	3.85E+00	N/A	2.00E+02	**7.70E-01**	7.70E-01	2.98E+02		NO	BSL
	18540-29-9	**CHROMIUM (HEXAVALENT)[10]**	**N/A**		**N/A**		**mg/kg**	**N/A**	**N/A**	**N/A**	**Yes**	**2.18E+00**	**ND**	**4.30E-02**	**2.00E+02**	**2.34E-02**	**2.34E-02**	**1.39E-02**	**c**	**YES**	**ASL**
	7440-48-4	**COBALT**	**1.20E-01**	**J**	**2.50E-01**	**J**	**mg/kg**	**PCSD04**	**PCSD04-BTCF**	**4 / 4**	**No**	**6.12E+02**	**ND**	**N/A**	**3.00E+02**	**N/A**	**2.50E-01**	**5.96E-02**	**n**	**YES**	**ASL**
	7440-50-8	**COPPER**	**3.50E+00**		**5.00E+00**		**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**Yes**	**3.98E+02**	**5.60E+00**	**1.40E-01**	**2.00E+02**	**1.39E+01**	**1.39E+01**	**7.95E+00**	**n**	**YES**	**ASL**
	7439-89-6	**IRON**	**5.82E+01**		**2.99E+02**		**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**No**	**3.93E+04**	**9.63E+02**	**N/A**	**2.00E+02**	**1.93E+02**	**2.99E+02**	**1.39E+02**	**n**	**YES**	**BSL**
	7439-92-1	**LEAD**	**3.60E-01**	**J**	**1.00E+00**		**mg/kg**	**PCSD12**	**PCSD12-BTCF**	**4 / 4**	**Yes**	**3.02E+02**	**3.65E+00**	**1.61E-01**	**3.00E+02**	**1.22E+01**	**1.22E+01**	**N/A**		**YES**	**[11]**
	7439-95-4	MAGNESIUM	1.99E+02	J	6.28E+02		mg/kg	PCSD12	PCSD12-BTCF	4 / 4	No	6.93E+03	6.17E+05	N/A	N/A	N/A	6.28E+02	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**8.10E+00**		**1.52E+01**		**mg/kg**	**PCSD02**	**PCSD02-BTCF**	**4 / 4**	**No**	**3.45E+02**	**1.20E+02**	**N/A**	**4.00E+02**	**4.78E+01**	**4.78E+01**	**2.78E+01**	**n**	**YES**	**ASL**
	7440-02-0	NICKEL	4.60E-01	J	2.00E+00		mg/kg	PCSD12	PCSD12-BTCF	4 / 4	Yes	9.42E+02	1.48E+01	N/A	1.00E+02	1.48E+00	2.00E+00	3.97E+00	n	NO	BSL
	7440-09-7	POTASSIUM	1.14E+03		2.79E+03		mg/kg	PCSD04	PCSD04-BTCF	4 / 4	No	4.20E+03	2.15E+05	N/A	N/A	N/A	2.79E+03	N/A		NO	NUT
	7782-49-2	**SELENIUM**	**3.10E-01**	**J**	**3.30E-01**	**J**	**mg/kg**	**PCSD02**	**PCSD02-BTCF**	**2 / 4**	**Yes**	**ND**	**5.00E+00**	**N/A**	**2.00E+02**	**1.00E+00**	**1.00E+00**	**9.93E-01**	**n**	**YES**	**ASL**
	7440-23-5	SODIUM	9.39E+02		1.92E+03		mg/kg	PCSD12	PCSD12-BTCF	4 / 4	No	1.16E+04	5.12E+06	N/A	2.00E+01	**1.02E+05**	1.02E+05	N/A		NO	NUT
	7440-31-5	TIN	4.60E+00		7.50E+00		mg/kg	PCSD09	PCSD09-BTCF	4 / 4	No	N/A	N/A	N/A	3.00E+03	N/A	7.50E+00	1.19E+02	n	NO	BSL
	7440-66-6	**ZINC**	**4.18E+01**		**4.85E+01**		**mg/kg**	**PCSD02**	**PCSD02-BTCF**	**4 / 4**	**Yes**	**1.48E+03**	**7.26E+01**	**1.30E+00**	**1.00E+03**	**4.81E+02**	**4.81E+02**	**5.96E+01**	**n**	**YES**	**ASL**
	14913-49-6	BISMUTH-212	Not analyzed		Not analyzed		pCi/g	N/A	N/A	N/A	Yes	1.58E+00	ND	1.00E+00	1.00E+00	3.95E-01	3.95E-01	3.37E+00		NO	BSL
	14733-03-0	**BISMUTH-214**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**9.08E-01**	**ND**	**1.00E+00**	**1.00E+00**	**2.27E-01**	**2.27E-01**	**9.88E-04**		**YES**	**ASL**
	10045-97-3	**CESIUM-137**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**4.67E-01**	**ND**	**1.00E+00**	**1.00E+00**	**1.17E-01**	**1.17E-01**	**9.10E-02**		**YES**	**ASL**
	15092-94-1	LEAD-212	Not analyzed		Not analyzed		pCi/g	N/A	N/A	N/A	Yes	1.23E+00	ND	1.61E-01	3.00E+02	4.95E-02	4.95E-02	9.27E-02		NO	BSL
	15067-28-4	**LEAD-214**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**1.04E+00**	**ND**	**1.61E-01**	**3.00E+02**	**4.20E-02**	**4.20E-02**	**9.88E-04**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**No**	**1.88E+01**	**1.94E+02**	**1.00E+00**	**1.00E+00**	**4.70E+00**	**4.70E+00**	9.95E-02		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**1.38E+00**	**ND**	**1.00E+00**	**1.00E+00**	**3.45E-01**	**3.45E-01**	**1.84E-03**		**YES**	**ASL**
	10098-97-2	**STRONTIUM-90**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**4.81E-01**	**ND**	**1.00E+00**	**6.00E+01**	**1.20E-01**	**1.20E-01**	**3.57E-02**		**YES**	**ASL**
	14913-50-9	THALLIUM-208	Not analyzed		Not analyzed		pCi/g	N/A	N/A	N/A	Yes	4.14E-01	ND	1.00E+00	1.00E+04	1.04E-01	1.04E-01	N/A		NO	NTX
	15117-96-1	**URANIUM-235**	**Not analyzed**		**Not analyzed**		**pCi/g**	**N/A**	**N/A**	**N/A**	**Yes**	**1.64E-01**	**ND**	**1.00E+00**	**1.00E+01**	**4.10E-02**	**4.10E-02**	**3.48E-03**		**YES**	**ASL**

[1] Biota-Sediment Accumulation Factors (BSAFs) obtained from EPA (2008) and EPA (1997). BSAFs for metals are presented in kg-sed[dw]/kg-fish [dw]; BSAFs for organics are presented in kg-OC[dw]/kg-lipid[dw].
A default value of 1 was used for those radionuclides for which the associated element does not have a published BSAF.

[2] Bioconcentration factors (BCFs) obtained from Oak Ridge National Laboratory (ORNL), 2015. Risk Assessment Information System. URL: http://rais.ornl.gov/cgi-bin/tools/TOX_search
A default value of 1 was used for those radionuclides for which the associated element does not have a published BCF.

[3] Estimated sport fish tissue concentrations are the highest of the values estimated using sediment data) and surface water data. Equations used for both calculation are shown below.
Inorganics: Fish EPC (mg/kg-fish [ww]) = Sed EPC (mg/kg-sed [dw]) x BSAF (kg-sed [dw]/kg-fish [dw]).
Organics: Fish EPC (mg/kg-fish [ww]) = Sed EPC (mg/kg-sed [dw]) x lipid normalized BSAF (kg-OC [dw]/kg-lipid [dw]) x (%lipid / %OC).
Calculated assuming 5.9% organic carbon in sediment, 5% lipid for fish (EPA, 2000), and 75% moisture in fish (EPA, 1993).
Sediment organic carbon fraction is the average total organic carbon concentration for the Paradise Creek sediment samples.
Fish tissue concentrations based on surface water concentrations and BCFs:
Fish Concentration (mg/kg-fish) = BCF (L-sw/kg-fish) x Surface Water Concentration (mg/L-sw)

[4] Used the higher of the estimated sport fish tissue concentration and mummichog tissue concentration.

[5] The lower of the site-specific screening level calculated for the child or adult receptor using toxicology data presented in the EPA RSL tables and the site exposure assumptions presented in Tables 4.15 and 4.16. Screening levels based on non-cancer (n) based on HQ = 0.1; screening levels based on cancer (c) based on cancer risk = $1x10^{-6}$. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml (chemical hazards) and PRGs for radiologicals were obtained using the EPA PRG Calculator using the default exposure scenario and variables (Section 5, Table 1 of the User's Guide). Available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

[6] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)
NB = not bioaccumulative

[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[10] The chromium results in fish samples were not speciated; hexavalent chromium fish tissue concentrations estimated using speciated sediment and surface water data.

[11] Lead retained as a COPC for evaluation in the Integrated Exposure Uptake Biokinetic model.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
c = Carcinogenic
n = Noncarcinogenic
mg/kg = milligrams per kilogram
N/A = Not applicable
ND = not detected

EPA, 1993. Wildlife Exposure Factors Handbook. Volume I of II. USEPA/600/R-93/187a. Table 4-1.

EPA, 1997. The Incidence and Severity of Sediment Contamination in Surface Waters of the United States. Volume 1: National Sediment Quality Survey, Appendix D - Screening Values for Chemicals Evaluated. EPA 823-R-97-006.

EPA, 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 2, Risk Assessment and Fish Consumption Limits.

EPA, 2008. Biota-Sediment Accumulation Factor Data Set, Version 1.0. Prepared for the U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Mid-Continent Ecology Division (MED), Duluth, Minnesota. Prepared by Computer Sciences Corporation Duluth, Minnesota Contract 68 W-02 032, Task 5003 and 5004. January 2008. http://www.epa.gov/med/Prods_Pubs/bsaf.htm

Table 2.16
Occurrence, Distribution, and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Paradise Creek Shellfish
Exposure Medium: Shellfish

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Paradise Creek																
	205-99-2	**BENZO[B]FLUORANTHENE**	**2.10E-01 J**	**2.10E-01 J**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**1 / 4**	**1.10E-01 - 1.10E-01**	**2.10E-01**	**N/A**	**6.64E-02 c**	**N/A**		**YES**	**ASL**
	72-54-8	**4,4'-DDD**	**6.50E-03 J**	**1.20E-02 J**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**4 / 4**	**N/A**	**1.20E-02**	**N/A**	**5.69E-03 c**	**N/A**		**YES**	**ASL**
	72-55-9	**4,4'-DDE**	**1.70E-02**	**3.15E-02**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**4 / 4**	**N/A**	**3.15E-02**	**N/A**	**1.95E-02 c**	**N/A**		**YES**	**ASL**
	50-29-3	4,4'-DDT	6.30E-03 J	1.10E-02 J	mg/kg	PCSD04	PCSD04-BTOY	4 / 4	N/A	1.10E-02	N/A	1.95E-02 c	N/A		NO	BSL
	309-00-2	**ALDRIN**	**1.50E-03 J**	**1.90E-03 J**	**mg/kg**	**PCSD12**	**PCSD12-BTOY**	**3 / 4**	**3.30E-04 - 3.30E-04**	**1.90E-03**	**N/A**	**3.90E-04 c**	**N/A**		**YES**	**ASL**
	12789-03-6	CHLORDANE	7.50E-03 J	1.42E-02 J	mg/kg	PCSD04	PCSD04-BTOY	4 / 4	N/A	1.42E-02	N/A	1.90E-02 c	N/A		NO	BSL
	60-57-1	**DIELDRIN**	**2.25E-03 J**	**3.30E-03 J**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**4 / 4**	**N/A**	**3.30E-03**	**N/A**	**4.15E-04 c**	**N/A**		**YES**	**ASL**
	72-20-8	ENDRIN	2.40E-03 J	4.05E-03 J	mg/kg	PCSD04	PCSD04-BTOY	4 / 4	N/A	4.05E-03	N/A	5.69E-02 n	N/A		NO	BSL
	1024-57-3	**HEPTACHLOR EPOXIDE**	**1.80E-03 J**	**3.15E-03 J**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**4 / 4**	**N/A**	**3.15E-03**	**N/A**	**7.29E-04 c**	**N/A**		**YES**	**ASL**
	11097-69-1	**AROCLOR-1254**	**3.80E-02 J**	**6.30E-02 J**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**4 / 4**	**N/A**	**6.30E-02**	**N/A**	**3.32E-03 c**	**N/A**		**YES**	**ASL**
	N/A	**High Risk PCBs**	**1.04E-01**	**1.54E-01**	**mg/kg**	**PCSD02**	**PCSD02-BTOY**	**4/4**	**N/A**	**1.54E-01**	**N/A**	**2.10E-03 c**	**N/A**		**YES**	**ASL**
	N/A	**Dioxinlike PCBs TEQ**	**4.11E-06**	**5.65E-06**	**mg/kg**	**PCSD02**	**PCSD02-BTOY**	**4/4**	**N/A**	**5.65E-06**	**N/A**	**2.65E-08 c**	**N/A**		**YES**	**ASL**
	N/A	**2,3,7,8-TCDD TEQ**	**1.41E-06**	**1.67E-06**	**mg/kg**	**PCSD02**	**PCSD02-BTOY**	**4/4**	**N/A**	**1.67E-06**	**N/A**	**2.65E-08 c**	**N/A**		**YES**	**ASL**
	7429-90-5	ALUMINUM (FUME OR DUST)	3.02E+01	1.36E+02	mg/kg	PCSD12	PCSD12-BTOY	4 / 4	N/A	1.36E+02	N/A	1.90E+02 n	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**7.20E-01**	**7.90E-01**	**mg/kg**	**PCSD12**	**PCSD12-BTOY**	**4 / 4**	**N/A**	**7.90E-01**	**N/A**	**4.42E-03 c**	**N/A**		**YES**	**ASL**
	7440-43-9	**CADMIUM**	**3.50E-01 J**	**4.00E-01 J**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**4 / 4**	**N/A**	**4.00E-01**	**N/A**	**1.90E-01 n**	**N/A**		**YES**	**ASL**
	7440-70-2	CALCIUM METAL	8.79E+02	1.51E+04	mg/kg	PCSD02	PCSD02-BTOY	4 / 4	N/A	1.51E+04	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM	2.80E-01 J	5.20E-01 J	mg/kg	PCSD12	PCSD12-BTOY	4 / 4	N/A	5.20E-01	N/A	2.84E+02	N/A		NO	BSL
	7440-47-3	**CHROMIUM[6]**	**2.80E-01 J**	**5.20E-01 J**	**mg/kg**	**PCSD12**	**PCSD12-BTOY**	**4 / 4**	**N/A**	**5.20E-01**	**N/A**	**1.33E-02 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**2.00E-01 J**	**2.75E-01 J**	**mg/kg**	**PCSD04**	**PCSD04-BTOY**	**4 / 4**	**N/A**	**2.75E-01**	**N/A**	**5.69E-02 n**	**N/A**		**YES**	**ASL**
	7440-50-8	**COPPER**	**3.55E+01**	**4.83E+01**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**4 / 4**	**N/A**	**4.83E+01**	**N/A**	**7.58E+00 n**	**N/A**		**YES**	**ASL**
	7439-89-6	**IRON**	**1.25E+02**	**1.51E+02**	**mg/kg**	**PCSD02**	**PCSD02-BTOY**	**4 / 4**	**N/A**	**1.51E+02**	**N/A**	**1.33E+02 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**3.20E-01 J**	**4.60E-01 J**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**4 / 4**	**N/A**	**4.60E-01**	**N/A**	**N/A**	**N/A**		**YES**	**[7]**
	7439-95-4	MAGNESIUM	2.11E+02 J	5.87E+02	mg/kg	PCSD02	PCSD02-BTOY	4 / 4	N/A	5.87E+02	N/A	N/A	N/A		NO	NUT
	7439-96-5	MANGANESE	1.05E+00	1.70E+00	mg/kg	PCSD09	PCSD09-BTOY	4 / 4	N/A	1.70E+00	N/A	2.65E+01 n	N/A		NO	BSL
	7439-97-6	**MERCURY**	**1.30E-01**	**1.30E-01**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**1 / 4**	**6.00E-03 - 6.00E-03**	**1.30E-01**	**N/A**	**1.90E-02 n**	**N/A**		**YES**	**ASL**
	7440-02-0	NICKEL	2.50E-01 J	3.30E-01 J	mg/kg	PCSD12	PCSD12-BTOY	4 / 4	N/A	3.30E-01	N/A	3.79E+00 n	N/A		NO	BSL
	7440-09-7	POTASSIUM	1.02E+03	2.12E+03	mg/kg	PCSD02	PCSD02-BTOY	4 / 4	N/A	2.12E+03	N/A	N/A	N/A		NO	NUT
	7440-23-5	SODIUM	1.05E+03	1.56E+03	mg/kg	PCSD02	PCSD02-BTOY	4 / 4	N/A	1.56E+03	N/A	N/A	N/A		NO	NUT
	7440-66-6	**ZINC**	**1.05E+03**	**1.22E+03**	**mg/kg**	**PCSD09**	**PCSD09-BTOY**	**4 / 4**	**N/A**	**1.22E+03**	**N/A**	**5.69E+01 n**	**N/A**		**YES**	**ASL**
	14913-49-6	BISMUTH-212	Not estimated	3.48E-01	pCi/g				N/A	3.48E-01	N/A	3.00E+00 c	N/A		NO	BSL
	14733-03-0	**BISMUTH-214**	Not estimated	**2.00E-01**	pCi/g				**N/A**	**2.00E-01**	**N/A**	**8.80E-04 c**	**N/A**		**YES**	**ASL**
	10045-97-3	**CESIUM-137**	Not estimated	**1.03E-01**	pCi/g				**N/A**	**1.03E-01**	**N/A**	**8.11E-02 c**	**N/A**		**YES**	**ASL**
	15092-94-1	LEAD-212	Not estimated	7.69E-02	pCi/g	Tissue samples not analyzed for radionuclides.			N/A	7.69E-02	N/A	8.27E-02 c	N/A		NO	BSL
	15067-28-4	**LEAD-214**	Not estimated	**6.91E-02**	pCi/g	Detection frequencies, locations of maximum			**N/A**	**6.91E-02**	**N/A**	**8.80E-04 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	Not estimated	**4.14E+00**	pCi/g	detections, and field sample identifications are provided			**N/A**	**4.14E+00**	**N/A**	**8.87E-02 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	Not estimated	**3.04E-01**	pCi/g	in Table 2.12.			**N/A**	**3.04E-01**	**N/A**	**1.64E-03 c**	**N/A**		**YES**	**ASL**
	10098-97-2	**STRONTIUM-90**	Not estimated	**1.06E-01**	pCi/g				**N/A**	**1.06E-01**	**N/A**	**3.18E-02 c**	**N/A**		**YES**	**ASL**
	14913-50-9	THALLIUM-208	Not estimated	9.11E-02	pCi/g				N/A	9.11E-02	N/A	N/A	N/A		NO	NTX
	15117-96-1	**URANIUM-235**	Not estimated	**3.61E-02**	pCi/g				**N/A**	**3.61E-02**	**N/A**	**3.10E-03 c**	**N/A**		**YES**	**ASL**

[1] Minimum/Maximum detected concentrations except for radionuclides. Tissue samples were not analyzed for radionuclides. See Table 2.16a for estimation of radionuclide tissue concentrations from sediment data.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] The lower of the site-specific screening level calculated for the child or adult receptor using toxicology data presented in the EPA RSL tables and the site exposure assumptions presented in Tables 4.15 and 4.17. Screening levels based on non-cancer (n) based on HQ = 0.1; screening levels based on cancer (c) based on cancer risk = $1x10^{-6}$.
Available: http://epa-prgs.ornl.gov/chemicals/index.shtml (chemical COPCs) and

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
Deletion Reason:	Below Screening Level (BSL)
	No Screening Value (NTX)
	Essential Nutrient (NUT)

[6] The chromium results in shellfish samples were not speciated; total chromium concentrations screened against both trivalent and hexavalent chromium RSLs.

[7] Lead retained as a COPC for evaluation in the Integrated Exposure Uptake Biokinetic model.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
mg/kg = milligrams per kilogram
N/A = Not available

Table 2.17
Occurrence, Distribution and Selection of Chemicals of Potential Concern

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

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Background Value [3]	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
Peck																
	541-73-1	1,3-DICHLOROBENZENE	1.25E+00 J	1.40E+00 J	ug/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	1.40E+00	N/A	N/A	N/A		NO	NTX
	106-46-7	**1,4-DICHLOROBENZENE**	**1.85E+00 J**	**2.30E+00 J**	**ug/L**	**MW04**	**MW04-092015**	**4 / 100**	**5.00E+00 - 5.00E+00**	2.30E+00	**N/A**	**4.80E-01 c**	**N/A**		**YES**	**ASL**
	78-93-3	2-BUTANONE	3.00E+00 J	3.00E+00 J	ug/L	WATW03	WATW03-092015	1 / 100	1.00E+01 - 1.00E+01	3.00E+00	N/A	5.60E+02 n	N/A		NO	BSL
	67-64-1	ACETONE	7.40E+00 J	7.40E+00 J	ug/L	MW13	MW13-122015	1 / 100	1.00E+01 - 1.40E+01	7.40E+00	N/A	1.40E+03 n	N/A		NO	BSL
	75-15-0	CARBON DISULFIDE	1.10E+00 J	2.20E+00 J	ug/L	WATW04	WATW04-122015	5 / 100	5.00E+00 - 5.00E+00	2.20E+00	N/A	8.10E+01 n	N/A		NO	BSL
	108-90-7	**CHLOROBENZENE**	**3.70E+01**	**4.10E+01**	**ug/L**	**MW04**	**MW04-092015**	**4 / 100**	**5.00E+00 - 5.00E+00**	4.10E+01	**N/A**	**7.80E+00 n**	**N/A**		**YES**	**ASL**
	75-00-3	CHLOROETHANE	1.60E+00 J	1.60E+00 J	ug/L	MW16	MW16-122015	1 / 100	5.00E+00 - 5.00E+00	1.60E+00	N/A	2.10E+03 n	N/A		NO	BSL
	156-59-2	**CIS-1,2-DICHLOROETHENE**	**4.60E+00 J**	**4.50E+01 J**	**ug/L**	**MW18**	**MW18-092015**	**8 / 100**	**5.00E+00 - 5.00E+00**	4.50E+01	**N/A**	**3.60E+00 n**	**N/A**		**YES**	**ASL**
	179601-23-1	m,p-XYLENE	1.05E+00 J	1.05E+00 J	ug/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.05E+00	N/A	1.90E+01 n	N/A		NO	BSL
	79-20-9	METHYL ACETATE	1.10E+00 J	5.60E+00 J	ug/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	5.60E+00	N/A	2.00E+03 n	N/A		NO	BSL
	1634-04-4	METHYL TERT-BUTYL ETHER	1.00E+00 J	1.30E+01	ug/L	MW21	MW21-092015	13 / 100	5.00E+00 - 5.00E+00	1.30E+01	N/A	1.40E+01 c	N/A		NO	BSL
	95-47-6	o-XYLENE	1.00E+00 J	1.00E+00 J	ug/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.00E+00	N/A	1.90E+01 n	N/A		NO	BSL
	108-88-3	TOLUENE	1.10E+00 J	3.05E+00 J	ug/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	3.05E+00	N/A	1.10E+02 n	N/A		NO	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	4.10E+00 J	4.50E+00 J	ug/L	MW18	MW18-032016	4 / 100	5.00E+00 - 5.00E+00	4.50E+00	N/A	3.60E+01 n	N/A		NO	BSL
	75-01-4	**VINYL CHLORIDE**	**4.30E+00 J**	**5.10E+00**	**ug/L**	**MW18**	**MW18-122015; MW18A-062016**	**3 / 100**	**5.00E+00 - 5.00E+00**	5.10E+00	**N/A**	**1.90E-02 c**	**N/A**		**YES**	**ASL**
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.92E+00 J	2.40E+00 J	ug/L	MW13	MW13-092015	2 / 99	4.72E+00 - 5.68E+00	2.40E+00	N/A	5.60E+00 c	N/A		NO	BSL
	105-60-2	CAPROLACTAM	1.90E+00 J	1.90E+00 J	ug/L	WATW04	WATW04-062016	1 / 99	4.72E+00 - 1.00E+01	1.90E+00	N/A	9.90E+02 n	N/A		NO	BSL
	84-66-2	DIETHYL PHTHALATE	1.00E+00 J	9.80E+00	ug/L	MW12	MW12-092015	5 / 99	4.72E+00 - 5.68E+00	9.80E+00	N/A	1.50E+03 n	N/A		NO	BSL
	131-11-3	DIMETHYL PHTHALATE	1.20E+00 J	3.00E+01	ug/L	MW13	MW13-092015	14 / 99	4.72E+00 - 5.68E+00	3.00E+01	N/A	N/A	N/A		NO	NTX
	91-20-3	**NAPHTHALENE**	**1.30E+00 J**	**1.30E+00 J**	**ug/L**	**MW06**	**MW06A-122015**	**1 / 99**	**4.72E+00 - 5.68E+00**	1.30E+00	**N/A**	**1.70E-01 c**	**N/A**		**YES**	**ASL**
	108-95-2	PHENOL	2.20E+00 J	3.00E+00 J	ug/L	MW23	MW23-122015	3 / 96	4.72E+00 - 1.00E+01	3.00E+00	N/A	5.80E+02 n	N/A		NO	BSL
	NA	**TEQ for PCB Congeners [7]**	**4.51E-09**	**3.23E-07**	**ug/L**	**MW07**	**MW07-122015**	**18 / 18**	**N/A**	3.23E-07	**N/A**	**1.20E-07 c**	**N/A**		**YES**	**ASL**
	NA	**High Risk PCBs [8]**	**2.27E-03**	**1.24E-01**	**ug/L**	**MW09**	**MW09-092015**	**18 / 18**	**N/A**	1.24E-01	**N/A**	**N/A**	**N/A**		**YES**	**TOX [9]**
	NA	**2,3,7,8-TCDD TEQ [10]**	**3.20E-09**	**1.20E-05**	**ug/L**	**MW22**	**MW22-062016**	**32 / 47**	**N/A**	1.20E-05	**N/A**	**1.20E-07 c**	**N/A**		**YES**	**ASL**
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**2.50E+00 J**	**5.73E+03**	**ug/L**	**MW13**	**MW13-122015**	**69 / 100**	**2.00E+01 - 2.00E+02**	5.73E+03	**N/A**	**2.00E+03 n**	**N/A**		**YES**	**ASL**
	7440-36-0	**ANTIMONY**	**2.40E+00**	**1.94E+01 J**	**ug/L**	**MW10**	**MW10-092015**	**4 / 100**	**2.00E+00 - 6.00E+01**	1.94E+01	**N/A**	**7.80E-01 n**	**N/A**		**YES**	**ASL**
	7440-38-2	**ARSENIC**	**2.80E-01 J**	**4.12E+01**	**ug/L**	**MW06**	**MW06-092015**	**93 / 100**	**1.00E+00 - 1.00E+01**	4.12E+01	**N/A**	**5.20E-02 c**	**N/A**		**YES**	**ASL**
	7440-39-3	**BARIUM**	**1.53E+01**	**1.42E+03**	**ug/L**	**MW20**	**MW20-122015**	**100 / 100**	**N/A**	1.42E+03	**N/A**	**3.80E+02 n**	**N/A**		**YES**	**ASL**
	7440-41-7	BERYLLIUM	7.00E-02 J	4.10E-01 J	ug/L	MW13	MW13-122015	6 / 100	1.00E+00 - 5.00E+00	4.10E-01	N/A	2.50E+00 n	N/A		NO	BSL
	7440-43-9	**CADMIUM**	**7.50E-02 J**	**7.20E+00**	**ug/L**	**MW10**	**MW10-092015**	**22 / 100**	**1.00E+00 - 5.00E+00**	7.20E+00	**N/A**	**9.20E-01 n**	**N/A**		**YES**	**ASL**
	7440-70-2	CALCIUM METAL	1.23E+03	3.08E+05	ug/L	WATW04	WATW04-092015	100 / 100	N/A	3.08E+05	N/A	N/A	N/A		NO	NUT
	7440-47-3	**CHROMIUM[6]**	**1.80E-01 J**	**2.06E+02**	**ug/L**	**WATW01**	**WATW01-122015**	**51 / 100**	**2.00E+00 - 1.00E+01**	2.06E+02	**N/A**	**3.50E-02 c**	**N/A**		**YES**	**ASL**
	7440-47-3	CHROMIUM[6]	1.80E-01 J	2.06E+02	ug/L	WATW01	WATW01-122015	51 / 100	2.00E+00 - 1.00E+01	2.06E+02	N/A	2.20E+03 n	N/A		NO	BSL
	18540-29-9	**CHROMIUM (HEXAVALENT**	**2.00E+00 J**	**1.20E+02 J-**	**ug/L**	**MW05**	**MW05-092015**	**38 / 94**	**1.00E+00 - 1.00E+02**	1.20E+02	**N/A**	**3.50E-02 c**	**N/A**		**YES**	**ASL**
	7440-48-4	**COBALT**	**1.60E-01 J**	**5.50E+02**	**ug/L**	**MW16**	**MW16-092015**	**69 / 100**	**1.00E+00 - 5.00E+01**	5.50E+02	**N/A**	**6.00E-01 n**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	1.10E+00	6.13E+01	ug/L	MW10	MW10-092015	41 / 100	1.00E+00 - 2.50E+01	6.13E+01	N/A	8.00E+01 n	N/A		NO	BSL
	57-12-5	**CYANIDE**	**5.90E-01 J**	**2.67E+02**	**ug/L**	**WATW04**	**WATW04-062016**	**16 / 100**	**1.00E+01 - 1.00E+01**	2.67E+02	**N/A**	**1.50E-01 n**	**N/A**		**YES**	**ASL**
	7439-89-6	**IRON**	**4.01E+01 J**	**7.41E+04**	**ug/L**	**MW16**	**MW16-092015**	**97 / 100**	**2.00E+02 - 2.00E+02**	7.41E+04	**N/A**	**1.40E+03 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**1.00E-01 J**	**4.70E+01**	**ug/L**	**MW19**	**MW19-032016**	**47 / 100**	**1.00E+00 - 1.00E+01**	4.70E+01	**N/A**	**1.50E+01**	**N/A**		**YES**	**ASL**
	7439-95-4	MAGNESIUM	1.59E+03	6.93E+05	ug/L	WATW01	WATW01-092015	100 / 100	N/A	6.93E+05	N/A	N/A	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**2.59E+01**	**1.51E+03**	**ug/L**	**WATW02**	**WATW02-092015**	**100 / 100**	**N/A**	1.51E+03	**N/A**	**4.30E+01 n**	**N/A**		**YES**	**ASL**
	7439-97-6	**MERCURY**	**4.60E-02 J**	**1.10E+00**	**ug/L**	**MW10**	**MW10-092015**	**27 / 100**	**2.00E-01 - 2.00E-01**	1.10E+00	**N/A**	**2.00E-01 n**	**N/A**		**YES**	**ASL**
	7440-02-0	**NICKEL**	**3.60E-01 J**	**2.10E+02**	**ug/L**	**MW16**	**MW16-092015**	**85 / 100**	**1.00E+00 - 4.00E+01**	2.10E+02	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-09-7	POTASSIUM	2.91E+02 J	2.36E+05	ug/L	WATW01	WATW01-092015	97 / 100	5.00E+02 - 5.00E+03	2.36E+05	N/A	N/A	N/A		NO	NUT
	7782-49-2	**SELENIUM**	**1.00E+00**	**4.91E+01**	**ug/L**	**WATW01**	**WATW01-122015**	**35 / 100**	**1.00E+00 - 3.50E+01**	4.91E+01	**N/A**	**1.00E+01 n**	**N/A**		**YES**	**ASL**
	7440-22-4	SILVER	1.20E+00 J	3.90E+00 J	ug/L	MW16	MW16-092015	7 / 100	1.00E+00 - 1.00E+01	3.90E+00	N/A	9.40E+00 n	N/A		NO	BSL
	7440-23-5	SODIUM	1.20E+04 J+	5.57E+06	ug/L	WATW01	WATW01-092015	99 / 100	1.00E+04 - 1.00E+04	5.57E+06	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**6.00E-02 J**	**1.05E+01 J**	**ug/L**	**MW16**	**MW16-092015**	**5 / 100**	**1.00E+00 - 3.50E+01**	1.05E+01	**N/A**	**2.00E-02 n**	**N/A**		**YES**	**ASL**
	7440-31-5	TIN	1.00E+00	1.50E+00	ug/L	MW19	MW19-062016	2 / 25	1.00E+00 - 1.00E+00	1.50E+00	N/A	1.20E+03 n	N/A		NO	BSL
	7440-62-2	**VANADIUM (FUME OR DUST)**	**1.60E-01 J**	**1.90E+01**	**ug/L**	**MW13**	**MW13-122015**	**41 / 100**	**2.00E+00 - 5.00E+01**	1.90E+01	**N/A**	**8.60E+00 n**	**N/A**		**YES**	**ASL**
	7440-66-6	ZINC	2.30E+00	5.52E+02 J	ug/L	MW08	MW08-032016	83 / 100	2.00E+00 - 6.00E+01	5.52E+02	N/A	6.00E+02 n	N/A		NO	BSL
	14733-03-0	**BISMUTH-214**	**2.85E+00 J**	**1.01E+01 J**	**pCi/L**	**MW19**	**MW19-122015**	**7 / 62**	**1.63E+00 - 1.05E+01**	1.01E+01	**N/A**	**1.96E-02 c**	**N/A**		**YES**	**ASL**
	14255-04-0	**LEAD-210**	**3.16E+01 J**	**3.16E+01 J**	**pCi/L**	**MW23**	**MW23-032016**	**1 / 37**	**1.52E+01 - 3.04E+01**	3.16E+01	**N/A**	**1.96E-02 c**	**N/A**		**YES**	**ASL**

Table 2.17
Occurrence, Distribution and Selection of Chemicals of Potential Concern

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

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration	Qualifier	Maximum [1] Concentration	Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Background Value [3]	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection [5]
	15092-94-1	**LEAD-212**	**1.96E+00**	**J**	**8.50E+00**	**J**	**pCi/L**	**MW05**	**MW05-032016**	**9 / 42**	**1.83E+00 - 9.07E+00**	8.50E+00	**N/A**	**2.02E+00**	**c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**7.44E+00**	**J**	**7.91E+00**	**J**	**pCi/L**	**MW05**	**MW05-122015**	**3 / 62**	**2.02E+00 - 1.07E+01**	7.91E+00	**N/A**	**1.96E-02**	**c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**1.22E+01**		**1.60E+02**		**pCi/L**	**WATW02**	**WATW02-122015**	**28 / 62**	**9.18E+00 - 5.59E+01**	1.60E+02	**N/A**	**2.12E+00**	**c**	**N/A**		**YES**	**ASL**
	13982-63-3	**RADIUM-226**	**2.23E+01**		**1.03E+02**		**pCi/L**	**MW04**	**MW04-092015**	**16 / 87**	**1.70E+01 - 1.03E+02**	1.03E+02	**N/A**	**4.30E-04**	**c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**3.74E+00**	**J**	**5.69E+00**	**J**	**pCi/L**	**MW11**	**MW11-032016**	**2 / 55**	**4.53E+00 - 5.00E+01**	5.69E+00	**N/A**	**1.07E-03**	**c**	**N/A**		**YES**	**ASL**
	10098-97-2	**STRONTIUM-90**	**3.90E-01**		**1.52E+00**		**pCi/L**	**MW10**	**MW10-122015**	**7 / 100**	**2.36E-01 - 3.11E+00**	1.52E+00	**N/A**	**7.07E-01**	**c**	**N/A**		**YES**	**ASL**
	14913-50-9	THALLIUM-208	9.62E-01	J	2.42E+00	J	pCi/L	MW13	MW13A-062016	6 / 9	9.71E-01 - 3.61E+00	2.42E+00	N/A	4.15E+04	c	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] EPA Regional Screening Level (RSL) for tapwater (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
RSL value for xylenes used for m,p-xylene.
RSL value for methyl mercury used for mercury
Radiological PRGs were calculated using the ORNL PRG calculator. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
ug/L = micrograms per liter
N/A = Not available
pCi/L = picocuries per liter

[6] Due to limited hexavalent chromium speciation; chromium concentrations screened against both hexavalent and trivalent chromium tap water RSL
[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[9] Identified as a COPC based on available toxicological data.
[10] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

Table 2.18
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Chemical Sufficiently Volatile/Toxic?[3]	Screening [4] Toxicity Value		COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Peck															
	541-73-1	1,3-DICHLOROBENZENE	1.25E+00 J	1.40E+00 J	ug/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	1.40E+00	No	N/A		NO	N/A
	106-46-7	1,4-DICHLOROBENZENE	1.85E+00 J	2.30E+00 J	ug/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	2.30E+00	Yes	2.60E+00	c	NO	BSL
	78-93-3	2-BUTANONE	3.00E+00 J	3.00E+00 J	ug/L	WATW03	WATW03-092015	1 / 100	1.00E+01 - 1.00E+01	3.00E+00	Yes	2.20E+05	n	NO	BSL
	67-64-1	ACETONE	7.40E+00 J	7.40E+00 J	ug/L	MW13	MW13-122015	1 / 100	1.00E+01 - 1.40E+01	7.40E+00	Yes	2.30E+06	n	NO	BSL
	75-15-0	CARBON DISULFIDE	1.10E+00 J	2.20E+00 J	ug/L	WATW04	WATW04-122015	5 / 100	5.00E+00 - 5.00E+00	2.20E+00	Yes	1.20E+02	n	NO	BSL
	108-90-7	CHLOROBENZENE	3.70E+01	4.10E+01	ug/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	4.10E+01	Yes	4.10E+01	n	NO	BSL
	75-00-3	CHLOROETHANE	1.60E+00 J	1.60E+00 J	ug/L	MW16	MW16-122015	1 / 100	5.00E+00 - 5.00E+00	1.60E+00	Yes	2.30E+03	n	NO	BSL
	156-59-2	CIS-1,2-DICHLOROETHENE	4.60E+00 J	4.50E+01 J	ug/L	MW18	MW18-092015	8 / 100	5.00E+00 - 5.00E+00	4.50E+01	No	N/A		NO	N/A
	179601-23-1	m,p-XYLENE	1.05E+00 J	1.05E+00 J	ug/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.05E+00	Yes	3.60E+01	n	NO	BSL
	79-20-9	METHYL ACETATE	1.10E+00 J	5.60E+00 J	ug/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	5.60E+00	No	N/A		NO	N/A
	1634-04-4	METHYL TERT-BUTYL ETHER	1.00E+00 J	1.30E+01	ug/L	MW21	MW21-092015	13 / 100	5.00E+00 - 5.00E+00	1.30E+01	Yes	4.50E+02	c	NO	BSL
	95-47-6	o-XYLENE	1.00E+00 J	1.00E+00 J	ug/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.00E+00	Yes	4.90E+01	n	NO	BSL
	108-88-3	TOLUENE	1.10E+00 J	3.05E+00 J	ug/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	3.05E+00	Yes	1.90E+03	n	NO	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	4.10E+00 J	4.50E+00 J	ug/L	MW18	MW18-032016	4 / 100	5.00E+00 - 5.00E+00	4.50E+00	No	N/A		NO	N/A
	75-01-4	**VINYL CHLORIDE**	**4.30E+00 J**	**5.10E+00**	ug/L	**MW18**	**MW18-122015; MW18A-062016**	**3 / 100**	**5.00E+00 - 5.00E+00**	**5.10E+00**	**Yes**	**1.50E-01**	**c**	**YES**	**ASL**
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.92E+00 J	2.40E+00 J	ug/L	MW13	MW13-092015	2 / 99	4.72E+00 - 5.68E+00	2.40E+00	No	N/A		NO	N/A
	105-60-2	CAPROLACTAM	1.90E+00 J	1.90E+00 J	ug/L	WATW04	WATW04-062016	1 / 99	4.72E+00 - 1.00E+01	1.90E+00	No	N/A		NO	N/A
	84-66-2	DIETHYL PHTHALATE	1.00E+00 J	9.80E+00	ug/L	MW12	MW12-092015	5 / 99	4.72E+00 - 5.68E+00	9.80E+00	No	N/A		NO	N/A
	131-11-3	DIMETHYL PHTHALATE	1.20E+00 J	3.00E+01	ug/L	MW13	MW13-092015	14 / 99	4.72E+00 - 5.68E+00	3.00E+01	No	N/A		NO	N/A
	91-20-3	NAPHTHALENE	1.30E+00 J	1.30E+00 J	ug/L	MW06	MW06A-122015	1 / 99	4.72E+00 - 5.68E+00	1.30E+00	Yes	4.60E+00	c	NO	BSL
	108-95-2	PHENOL	2.20E+00 J	3.00E+00 J	ug/L	MW23	MW23-122015	3 / 96	4.72E+00 - 1.00E+01	3.00E+00	No	N/A		NO	N/A
	NA	TEQ for PCB Congeners [6]	4.51E-09	3.23E-07	ug/L	MW07	MW07-122015	18 / 18	N/A	3.23E-07	Yes	3.60E-05	c	NO	BSL
	NA	High Risk PCBs [7]	2.27E-03	1.24E-01	ug/L	MW09	MW09-092015	18 / 18	N/A	1.24E-01	N/A	N/A		NO	N/A
	NA	2,3,7,8-TCDD TEQ [8]	3.20E-09	1.20E-05	ug/L	MW22	MW22-062016	32 / 47	N/A	1.20E-05	Yes	3.60E-05	c	NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	2.50E+00 J	5.73E+03	ug/L	MW13	MW13-122015	69 / 100	2.00E+01 - 2.00E+02	5.73E+03	No	N/A		NO	N/A
	7440-36-0	ANTIMONY	2.40E+00	1.94E+01 J	ug/L	MW10	MW10-092015	4 / 100	2.00E+00 - 6.00E+01	1.94E+01	No	N/A		NO	N/A
	7440-38-2	ARSENIC	2.80E-01 J	4.12E+01	ug/L	MW06	MW06-092015	93 / 100	1.00E+00 - 1.00E+01	4.12E+01	No	N/A		NO	N/A
	7440-39-3	BARIUM	1.53E+01	1.42E+03	ug/L	MW20	MW20-122015	100 / 100	N/A	1.42E+03	No	N/A		NO	N/A
	7440-41-7	BERYLLIUM	7.00E-02 J	4.10E-01 J	ug/L	MW13	MW13-122015	6 / 100	1.00E+00 - 5.00E+00	4.10E-01	No	N/A		NO	N/A
	7440-43-9	CADMIUM	7.50E-02 J	7.20E+00	ug/L	MW10	MW10-092015	22 / 100	1.00E+00 - 5.00E+00	7.20E+00	No	N/A		NO	N/A
	7440-70-2	CALCIUM METAL	1.23E+03	3.08E+05	ug/L	WATW04	WATW04-092015	100 / 100	N/A	3.08E+05	No	N/A		NO	N/A
	7440-47-3	CHROMIUM (TOTAL)	1.80E-01 J	2.06E+02	ug/L	WATW01	WATW01-122015	51 / 100	2.00E+00 - 1.00E+01	2.06E+02	No	N/A		NO	N/A
	18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	2.00E+00 J	1.20E+02 J-	ug/L	MW05	MW05-092015	38 / 94	1.00E+00 - 1.00E+02	1.20E+02	No	N/A		NO	N/A
	7440-48-4	COBALT	1.60E-01 J	5.50E+02	ug/L	MW16	MW16-092015	69 / 100	1.00E+00 - 5.00E+01	5.50E+02	No	N/A		NO	N/A
	7440-50-8	COPPER	1.10E+00	6.13E+01	ug/L	MW10	MW10-092015	41 / 100	1.00E+00 - 2.50E+01	6.13E+01	No	N/A		NO	N/A
	57-12-5	**CYANIDE**	**5.90E-01 J**	**2.67E+02**	ug/L	**WATW04**	**WATW04-062016**	**16 / 100**	**1.00E+01 - 1.00E+01**	**2.67E+02**	**Yes**	**2.00E+01**	**n**	**YES**	**ASL**
	7439-89-6	IRON	4.01E+01 J	7.41E+04	ug/L	MW16	MW16-092015	97 / 100	2.00E+02 - 2.00E+02	7.41E+04	No	N/A		NO	N/A
	7439-92-1	LEAD	1.00E-01 J	4.70E+01	ug/L	MW19	MW19-032016	47 / 100	1.00E+00 - 1.00E+01	4.70E+01	No	N/A		NO	N/A
	7439-95-4	MAGNESIUM	1.59E+03	6.93E+05	ug/L	WATW01	WATW01-092015	100 / 100	N/A	6.93E+05	No	N/A		NO	N/A
	7439-96-5	MANGANESE	2.59E+01	1.51E+03	ug/L	WATW02	WATW02-092015	100 / 100	N/A	1.51E+03	No	N/A		NO	N/A
	7439-97-6	**MERCURY**	**4.60E-02 J**	**1.10E+00**	ug/L	**MW10**	**MW10-092015**	**27 / 100**	**2.00E-01 - 2.00E-01**	**1.10E+00**	**Yes**	**8.90E-02**	**n**	**YES**	**ASL**
	7440-02-0	NICKEL	3.60E-01 J	2.10E+02	ug/L	MW16	MW16-092015	85 / 100	1.00E+00 - 4.00E+01	2.10E+02	No	N/A		NO	N/A
	7440-09-7	POTASSIUM	2.91E+02 J	2.36E+05	ug/L	WATW01	WATW01-092015	97 / 100	5.00E+02 - 5.00E+03	2.36E+05	No	N/A		NO	N/A
	7782-49-2	SELENIUM	1.00E+00	4.91E+01	ug/L	WATW01	WATW01-122015	35 / 100	1.00E+00 - 3.50E+01	4.91E+01	No	N/A		NO	N/A
	7440-22-4	SILVER	1.20E+00 J	3.90E+00 J	ug/L	MW16	MW16-092015	7 / 100	1.00E+00 - 1.00E+01	3.90E+00	No	N/A		NO	N/A
	7440-23-5	SODIUM	1.20E+04 J+	5.57E+06	ug/L	WATW01	WATW01-092015	99 / 100	1.00E+04 - 1.00E+04	5.57E+06	No	N/A		NO	N/A
	7440-28-0	THALLIUM	6.00E-02 J	1.05E+01 J	ug/L	MW16	MW16-092015	5 / 100	1.00E+00 - 3.50E+01	1.05E+01	No	N/A		NO	N/A
	7440-31-5	TIN	1.00E+00	1.50E+00	ug/L	MW19	MW19-062016	2 / 25	1.00E+00 - 1.00E+00	1.50E+00	No	N/A		NO	N/A

Table 2.18
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Chemical Sufficiently Volatile/Toxic?[3]	Screening [4] Toxicity Value	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-62-2	VANADIUM (FUME OR DUST)	1.60E-01 J	1.90E+01	ug/L	MW13	MW13-122015	41 / 100	2.00E+00 - 5.00E+01	1.90E+01	No	N/A	NO	N/A
	7440-66-6	ZINC	2.30E+00	5.52E+02 J	ug/L	MW08	MW08-032016	83 / 100	2.00E+00 - 6.00E+01	5.52E+02	No	N/A	NO	N/A
	14733-03-0	BISMUTH-214	2.85E+00 J	1.01E+01 J	pCi/L	MW19	MW19-122015	7 / 62	1.63E+00 - 1.05E+01	1.01E+01	N/A	N/A	NO	N/A
	14255-04-0	LEAD-210	3.16E+01 J	3.16E+01 J	pCi/L	MW23	MW23-032016	1 / 37	1.52E+01 - 3.04E+01	3.16E+01	N/A	N/A	NO	N/A
	15092-94-1	LEAD-212	1.96E+00 J	8.50E+00 J	pCi/L	MW05	MW05-032016	9 / 42	1.83E+00 - 9.07E+00	8.50E+00	N/A	N/A	NO	N/A
	15067-28-4	LEAD-214	7.44E+00 J	7.91E+00 J	pCi/L	MW05	MW05-122015	3 / 62	2.02E+00 - 1.07E+01	7.91E+00	N/A	N/A	NO	N/A
	13966-00-2	POTASSIUM-40	1.22E+01	1.60E+02	pCi/L	WATW02	WATW02-122015	28 / 62	9.18E+00 - 5.59E+01	1.60E+02	N/A	N/A	NO	N/A
	13982-63-3	RADIUM-226	2.23E+01	1.03E+02	pCi/L	MW04	MW04-092015	16 / 87	1.70E+01 - 1.03E+02	1.03E+02	N/A	N/A	NO	N/A
	15262-20-1	RADIUM-228	3.74E+00 J	5.69E+00 J	pCi/L	MW11	MW11-032016	2 / 55	4.53E+00 - 5.00E+01	5.69E+00	N/A	N/A	NO	N/A
	10098-97-2	STRONTIUM-90	3.90E-01	1.52E+00	pCi/L	MW10	MW10-122015	7 / 100	2.36E-01 - 3.11E+00	1.52E+00	N/A	N/A	NO	N/A
	14913-50-9	THALLIUM-208	9.62E-01 J	2.42E+00 J	pCi/L	MW13	MW13A-062016	6 / 9	9.71E-01 - 3.61E+00	2.42E+00	N/A	N/A	NO	N/A

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Sufficiently volatile/toxic obtained from the OSWER Vapor Intrusion Screening Level (VISL) Calculator, version 3.5 (EPA, 2017).

[4] Target Groundwater Concentration (cancer risk 1E-06, non-cancer HQ = 0.1) obtained from the VISL calculator (Version 3.5, June 2017) and in accordance with OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air (EPA, 2015).
Mercury conservatively assumed to be present in the elemental form.

[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Not Sufficiently Toxic/Volatile (N/A)

[6] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[7] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[8] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considere
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value
ug/L = micrograms per liter
N/A = Not available
pCi/L = picocuries per liter

Table 2.19
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Air Inside an Open Excavation

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Chemical Sufficiently Volatile/Toxic?[3]	Screening Toxicity Value [4]	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Peck														
	541-73-1	1,3-DICHLOROBENZENE	1.25E+00 J	1.40E+00 J	UG/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	1.40E+00	No	N/A	NO	N/A
	106-46-7	1,4-DICHLOROBENZENE	1.85E+00 J	2.30E+00 J	UG/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	2.30E+00	Yes	3.13E+04	NO	BSL
	78-93-3	2-BUTANONE	3.00E+00 J	3.00E+00 J	UG/L	WATW03	WATW03-092015	1 / 100	1.00E+01 - 1.00E+01	3.00E+00	Yes	6.26E+06	NO	BSL
	67-64-1	ACETONE	7.40E+00 J	7.40E+00 J	UG/L	MW13	MW13-122015	1 / 100	1.00E+01 - 1.40E+01	7.40E+00	Yes	5.45E+07	NO	BSL
	75-15-0	CARBON DISULFIDE	1.10E+00 J	2.20E+00 J	UG/L	WATW04	WATW04-122015	5 / 100	5.00E+00 - 5.00E+00	2.20E+00	Yes	2.98E+03	NO	BSL
	108-90-7	CHLOROBENZENE	3.70E+01	4.10E+01	UG/L	MW04	MW04-092015	4 / 100	5.00E+00 - 5.00E+00	4.10E+01	Yes	1.45E+04	NO	BSL
	75-00-3	CHLOROETHANE	1.60E+00 J	1.60E+00 J	UG/L	MW16	MW16-122015	1 / 100	5.00E+00 - 5.00E+00	1.60E+00	Yes	2.26E+04	NO	BSL
	156-59-2	CIS-1,2-DICHLOROETHENE	4.60E+00 J	4.50E+01 J	UG/L	MW18	MW18-092015	8 / 100	5.00E+00 - 5.00E+00	4.50E+01	No	N/A	NO	N/A
	179601-23-1	m,p-XYLENE	1.05E+00 J	1.05E+00 J	UG/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.05E+00	Yes	1.33E+03	NO	BSL
	79-20-9	METHYL ACETATE	1.10E+00 J	5.60E+00 J	UG/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	5.60E+00	No	N/A	NO	N/A
	1634-04-4	METHYL TERT-BUTYL ETHER	1.00E+00 J	1.30E+01	UG/L	MW21	MW21-092015	13 / 100	5.00E+00 - 5.00E+00	1.30E+01	Yes	4.43E+05	NO	BSL
	95-47-6	o-XYLENE	1.00E+00 J	1.00E+00 J	UG/L	MW22	MW22-122015	1 / 100	5.00E+00 - 5.00E+00	1.00E+00	Yes	1.83E+03	NO	BSL
	108-88-3	TOLUENE	1.10E+00 J	3.05E+00 J	UG/L	MW20	MW20-092015	2 / 100	5.00E+00 - 5.00E+00	3.05E+00	Yes	6.31E+04	NO	BSL
	156-60-5	TRANS-1,2-DICHLOROETHENE	4.10E+00 J	4.50E+00 J	UG/L	MW18	MW18-032016	4 / 100	5.00E+00 - 5.00E+00	4.50E+00	No	N/A	NO	N/A
	75-01-4	VINYL CHLORIDE	4.30E+00 J	5.10E+00	UG/L	MW18	MW18-122015; MW18A-062016	3 / 100	5.00E+00 - 5.00E+00	5.10E+00	Yes	2.19E+02	NO	BSL
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	1.92E+00 J	2.40E+00 J	UG/L	MW13	MW13-092015	2 / 99	4.72E+00 - 5.68E+00	2.40E+00	No	N/A	NO	N/A
	105-60-2	CAPROLACTAM	1.90E+00 J	1.90E+00 J	UG/L	WATW04	WATW04-062016	1 / 99	4.72E+00 - 1.00E+01	1.90E+00	No	N/A	NO	N/A
	84-66-2	DIETHYL PHTHALATE	1.00E+00 J	9.80E+00	UG/L	MW12	MW12-092015	5 / 99	4.72E+00 - 5.68E+00	9.80E+00	No	N/A	NO	N/A
	131-11-3	DIMETHYL PHTHALATE	1.20E+00 J	3.00E+01	UG/L	MW13	MW13-092015	14 / 99	4.72E+00 - 5.68E+00	3.00E+01	No	N/A	NO	N/A
	91-20-3	NAPHTHALENE	1.30E+00 J	1.30E+00 J	UG/L	MW06	MW06A-122015	1 / 99	4.72E+00 - 5.68E+00	1.30E+00	Yes	7.35E+01	NO	BSL
	108-95-2	PHENOL	2.20E+00 J	3.00E+00 J	UG/L	MW23	MW23-122015	3 / 96	4.72E+00 - 1.00E+01	3.00E+00	No	N/A	NO	N/A
	NA	TEQ for PCB Congeners [6]	4.51E-09	3.23E-07	UG/L	MW07	MW07-122015	18 / 18	N/A	3.23E-07	Yes	1.11E-01	NO	BSL
	NA	High Risk PCBs [7]	2.27E-03	1.24E-01	UG/L	MW09	MW09-092015	18 / 18	N/A	1.24E-01	N/A	N/A	NO	N/A
	NA	2,3,7,8-TCDD TEQ [8]	3.20E-09	1.20E-05	UG/L	MW22	MW22-062016	32 / 47	N/A	1.20E-05	Yes	1.11E-01	NO	BSL
	7429-90-5	ALUMINUM (FUME OR DUST)	2.50E+00 J	5.73E+03	UG/L	MW13	MW13-122015	69 / 100	2.00E+01 - 2.00E+02	5.73E+03	No	N/A	NO	N/A
	7440-36-0	ANTIMONY	2.40E+00	1.94E+01 J	UG/L	MW10	MW10-092015	4 / 100	2.00E+00 - 6.00E+01	1.94E+01	No	N/A	NO	N/A
	7440-38-2	ARSENIC	2.80E-01 J	4.12E+01	UG/L	MW06	MW06-092015	93 / 100	1.00E+00 - 1.00E+01	4.12E+01	No	N/A	NO	N/A
	7440-39-3	BARIUM	1.53E+01	1.42E+03	UG/L	MW20	MW20-122015	100 / 100	N/A	1.42E+03	No	N/A	NO	N/A
	7440-41-7	BERYLLIUM	7.00E-02 J	4.10E-01 J	UG/L	MW13	MW13-122015	6 / 100	1.00E+00 - 5.00E+00	4.10E-01	No	N/A	NO	N/A
	7440-43-9	CADMIUM	7.50E-02 J	7.20E+00	UG/L	MW10	MW10-092015	22 / 100	1.00E+00 - 5.00E+00	7.20E+00	No	N/A	NO	N/A
	7440-70-2	CALCIUM METAL	1.23E+03	3.08E+05	UG/L	WATW04	WATW04-092015	100 / 100	N/A	3.08E+05	No	N/A	NO	N/A
	7440-47-3	CHROMIUM (TOTAL)	1.80E-01 J	2.06E+02	UG/L	WATW01	WATW01-122015	51 / 100	2.00E+00 - 1.00E+01	2.06E+02	No	N/A	NO	N/A
	18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	2.00E+00 J	1.20E+02 J-	UG/L	MW05	MW05-092015	38 / 94	1.00E+00 - 1.00E+02	1.20E+02	No	N/A	NO	N/A
	7440-48-4	COBALT	1.60E-01 J	5.50E+02	UG/L	MW16	MW16-092015	69 / 100	1.00E+00 - 5.00E+01	5.50E+02	No	N/A	NO	N/A
	7440-50-8	COPPER	1.10E+00	6.13E+01	UG/L	MW10	MW10-092015	41 / 100	1.00E+00 - 2.50E+01	6.13E+01	No	N/A	NO	N/A
	57-12-5	**CYANIDE**	**1.50E-01 J**	**2.67E+02**	**UG/L**	**WATW04**	**WATW04-062016**	**16 / 100**	**1.00E+01 - 1.00E+01**	**2.67E+02**	**Yes**	**1.86E+02**	**YES**	**ASL**
	7439-89-6	IRON	4.01E+01 J	7.41E+04	UG/L	MW16	MW16-092015	97 / 100	2.00E+02 - 2.00E+02	7.41E+04	No	N/A	NO	N/A
	7439-92-1	LEAD	1.00E-01 J	4.70E+01	UG/L	MW19	MW19-032016	47 / 100	1.00E+00 - 1.00E+01	4.70E+01	No	N/A	NO	N/A
	7439-95-4	MAGNESIUM	1.59E+03	6.93E+05	UG/L	WATW01	WATW01-092015	100 / 100	N/A	6.93E+05	No	N/A	NO	N/A
	7439-96-5	MANGANESE	2.59E+01	1.51E+03	UG/L	WATW02	WATW02-092015	100 / 100	N/A	1.51E+03	No	N/A	NO	N/A
	7439-97-6	MERCURY	4.60E-02 J	1.10E+00	UG/L	MW10	MW10-092015	27 / 100	2.00E-01 - 2.00E-01	1.10E+00	Yes	5.59E+00	NO	BSL
	7440-02-0	NICKEL	3.60E-01 J	2.10E+02	UG/L	MW16	MW16-092015	85 / 100	1.00E+00 - 4.00E+01	2.10E+02	No	N/A	NO	N/A
	7440-09-7	POTASSIUM	2.91E+02 J	2.36E+05	UG/L	WATW01	WATW01-092015	97 / 100	5.00E+02 - 5.00E+03	2.36E+05	No	N/A	NO	N/A
	7782-49-2	SELENIUM	1.00E+00	4.91E+01	UG/L	WATW01	WATW01-122015	35 / 100	1.00E+00 - 3.50E+01	4.91E+01	No	N/A	NO	N/A
	7440-22-4	SILVER	1.20E+00 J	3.90E+00 J	UG/L	MW16	MW16-092015	7 / 100	1.00E+00 - 1.00E+01	3.90E+00	No	N/A	NO	N/A
	7440-23-5	SODIUM	1.20E+04 J+	5.57E+06	UG/L	WATW01	WATW01-092015	99 / 100	1.00E+04 - 1.00E+04	5.57E+06	No	N/A	NO	N/A
	7440-28-0	THALLIUM	6.00E-02 J	1.05E+01 J	UG/L	MW16	MW16-092015	5 / 100	1.00E+00 - 3.50E+01	1.05E+01	No	N/A	NO	N/A
	7440-31-5	TIN	1.00E+00	1.50E+00	UG/L	MW19	MW19-062016	2 / 25	1.00E+00 - 1.00E+00	1.50E+00	No	N/A	NO	N/A
	7440-62-2	VANADIUM (FUME OR DUST)	1.60E-01 J	1.90E+01	UG/L	MW13	MW13-122015	41 / 100	2.00E+00 - 5.00E+01	1.90E+01	No	N/A	NO	N/A
	7440-66-6	ZINC	2.30E+00	5.52E+02 J	UG/L	MW08	MW08-032016	83 / 100	2.00E+00 - 6.00E+01	5.52E+02	No	N/A	NO	N/A

Table 2.19
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Air Inside an Open Excavation

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Chemical Sufficiently Volatile/Toxic?[3]	Screening Toxicity Value [4]	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	14733-03-0	BISMUTH-214	2.85E+00 J	1.01E+01 J	PCI/L	MW19	MW19-122015	7 / 62	1.63E+00 - 1.05E+01	1.01E+01	N/A	N/A	NO	N/A
	14255-04-0	LEAD-210	3.16E+01 J	3.16E+01 J	PCI/L	MW23	MW23-032016	1 / 37	1.52E+01 - 3.04E+01	3.16E+01	N/A	N/A	NO	N/A
	15092-94-1	LEAD-212	1.96E+00 J	8.50E+00 J	PCI/L	MW05	MW05-032016	9 / 42	1.83E+00 - 9.07E+00	8.50E+00	N/A	N/A	NO	N/A
	15067-28-4	LEAD-214	7.44E+00 J	7.91E+00 J	PCI/L	MW05	MW05-122015	3 / 62	2.02E+00 - 1.07E+01	7.91E+00	N/A	N/A	NO	N/A
	13966-00-2	POTASSIUM-40	1.22E+01	1.60E+02	PCI/L	WATW02	WATW02-122015	28 / 62	9.18E+00 - 5.59E+01	1.60E+02	N/A	N/A	NO	N/A
	13982-63-3	RADIUM-226	2.23E+01	1.03E+02	PCI/L	MW04	MW04-092015	16 / 87	1.70E+01 - 1.03E+02	1.03E+02	N/A	N/A	NO	N/A
	15262-20-1	RADIUM-228	3.74E+00 J	5.69E+00 J	PCI/L	MW11	MW11-032016	2 / 55	4.53E+00 - 5.00E+01	5.69E+00	N/A	N/A	NO	N/A
	10098-97-2	STRONTIUM-90	3.90E-01	1.52E+00	PCI/L	MW10	MW10-122015	7 / 100	2.36E-01 - 3.11E+00	1.52E+00	N/A	N/A	NO	N/A
	14913-50-9	THALLIUM-208	9.62E-01 J	2.42E+00 J	PCI/L	MW13	MW13A-062016	6 / 9	9.71E-01 - 3.61E+00	2.42E+00	N/A	N/A	NO	N/A

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Sufficiently volatile/toxic obtained from the OSWER Vapor Intrusion Screening Level (VISL) Calculator, version 3.5 (EPA, 2017).
[4] VDEQ Tier III Groundwater Screening Levels (Table 2.13 of the Virginia Risk Assessment Guidance, 9 VAC 20-160-70[A](1)(a)).
Mercury conservatively assumed to be present in the elemental form.
[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
Not Sufficiently Toxic/Volatile (N/A)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
n = Noncarcinogenic
J = Estimated Value
mg/kg = milligrams per kilogram
N/A = Not available or not applicable
PCI/L = picocuries per liter

[6] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.
[7] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.
[8] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

Table 2.20
Occurrence, Distribution and Selection of Chemicals of Potential Concern

Scenario Timeframe: Current/Future
Medium: Building Surfaces
Exposure Medium: Dust

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units [6]	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration Used for Screening [2]	Background Value [3]	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Building Surfaces	12672-29-6 **11096-82-5** **7439-92-1**	AROCLOR-1248 **AROCLOR-1260** **LEAD**	8.99E-01 J **1.09E+00 J** **2.88E-01**	1.86E+00 J **2.79E+02 J** **3.51E+00**	ug/cm^2 **ug/cm^2** **ug/cm^2**	SBLDG **MBLDG** **MBLDG**	PCBWIPE09 **PCBWIPE08** **LEADWIPE08**	3 / 9 **6 / 9** **9 / 9**	1.55E-3 - 1.55E-3 **1.55E-3 - 1.55E-3** **N/A**	1.86E+00 **2.79E+02** **3.51E+00**	N/A **N/A** **N/A**	1.00E+01 **1.00E+01** **5.00E-02**	N/A **N/A** **N/A**		NO **YES** **YES**	BSL **ASL** **ASL**

[1] Minimum/Maximum detected concentrations.
[2] Maximum concentration is used for screening.
[3] Background values not available.
[4] PCB screening criteria from the Toxic Substance Control Act, high occupancy areas; lead screening level is the HUD Lead Hazard Screen limit.
[5] Rationale Codes
Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
[6] Sample results were originally reported in ug/wipe and were converted to ug/cm^2.

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
J = Estimated Value
ug/cm^2 = micrograms per square centimeter
N/A = Not available

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Field Sample associated with Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Cradock Community																
	205-99-2	BENZO[B]FLUORANTHENE	3.80E-01 J	3.80E-01 J	mg/kg	PCWLSD03	PCWLSD03-000005	1 / 14	0.28 to 0.77	3.80E-01	N/A	1.10E+00 c	N/A		NO	BSL
	85-68-7	BENZYL BUTYL PHTHALATE	2.40E-01 J	3.50E-01 J	mg/kg	PCWLSD01;	PCWLSD01-000005; PCWLSD06-	5 / 14	0.28 to 0.77	3.50E-01	N/A	N/A	N/A		NO	NTX
	117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	2.00E-01 J	3.70E-01 J	mg/kg	PCWLSD01	PCWLSD01-000005	3 / 14	0.28 to 0.77	3.70E-01	N/A	3.90E+01 c	N/A		NO	BSL
	84-74-2	DI-N-BUTYL PHTHALATE	4.60E-01 J	4.60E-01 J	mg/kg	PCWLSD01	PCWLSD01-000005	1 / 14	0.28 to 0.77	4.60E-01	N/A	6.30E+02 n	N/A		NO	BSL
	206-44-0	FLUORANTHENE	6.10E-01 J+	1.00E+00 J	mg/kg	PCWLSD03	PCWLSD03-000005	2 / 14	0.54 to 1.5	1.00E+00	N/A	2.40E+02 n	N/A		NO	BSL
	129-00-0	PYRENE	3.00E-01 J	5.50E-01 J	mg/kg	PCWLSD03	PCWLSD03-000005	2 / 14	0.28 to 0.77	5.50E-01	N/A	1.80E+02 n	N/A		NO	BSL
	11096-82-5	AROCLOR-1260	3.20E-02 J	4.90E-02 J	mg/kg	PCWLSD01	PCWLSD01-000005	3 / 14	0.054 to 0.15	4.90E-02	N/A	2.40E-01 c	N/A		NO	BSL
	NA	TEQ for PCB Congeners [7]	8.97E-06	8.97E-06	mg/kg	PCWLSD01	PCWLSD01-000005	1/1		8.97E-06	N/A	4.80E-05 c	N/A		NO	BSL
	NA	High Risk PCBs [8]	1.65E-01	1.65E-01	mg/kg	PCWLSD01	PCWLSD01-000005	1/1	-	1.65E-01	N/A	2.30E+00 c	N/A		NO	BSL
	NA	2,3,7,8-TCDD TEQ [9]	1.85E-06 J	2.53E-06 J	mg/kg	PCWLSD06	PCWLSD06-000005	2 / 2	-	2.53E-06	N/A	4.80E-06 c	N/A		NO	BSL
	7429-90-5	**ALUMINUM (FUME OR DUST)**	**2.90E+03**	**2.56E+04**	**mg/kg**	**PCWLSD02**	**PCWLSD02-000005**	**14 / 14**	**-**	**2.56E+04**	**N/A**	**7.70E+03 n**	**N/A**		**YES**	**ASL**
	7440-36-0	ANTIMONY	7.90E-01 J-	9.60E-01 J-	mg/kg	PCWLSD01	PCWLSD01-000005	2 / 14	7.2 to 15.1	9.60E-01	N/A	3.10E+00 n	N/A		NO	BSL
	7440-38-2	**ARSENIC**	**2.70E+00**	**1.87E+01 J**	**mg/kg**	**PCWLSD01;**	**PCWLSD01-000005; PCWLSD03-**	**14 / 14**	**-**	**1.87E+01**	**N/A**	**6.80E-01 c**	**N/A**		**YES**	**ASL**
	7440-39-3	BARIUM	1.19E+01 J	6.87E+01	mg/kg	PCWLSD02	PCWLSD02-000005	14 / 14	-	6.87E+01	N/A	1.50E+03 n	N/A		NO	BSL
	7440-41-7	BERYLLIUM	2.00E-01 J	1.30E+00	mg/kg	PCWLSD03;	PCWLSD03-000005; PCWLSD01-	14 / 14	-	1.30E+00	N/A	1.60E+01 n	N/A		NO	BSL
	7440-43-9	CADMIUM	1.80E-01 J-	2.60E+00	mg/kg	PCWLSD01	PCWLSD01-000005	14 / 14	-	2.60E+00	N/A	7.10E+00 n	N/A		NO	BSL
	7440-70-2	CALCIUM METAL	8.00E+02	2.72E+03	mg/kg	PCWLSD01	PCWLSD01-000005	14 / 14	-	2.72E+03	N/A	N/A	N/A		NO	NUT
	7440-47-3	CHROMIUM[6]	1.02E+01	2.40E+02 J	mg/kg	PCWLSD03	PCWLSD03-005020	14 / 14	-	2.40E+02	N/A	1.20E+05 n	N/A		NO	BSL
	7440-48-4	**COBALT**	**1.80E+00 J**	**1.91E+02**	**mg/kg**	**PCWLSD03**	**PCWLSD03-005020**	**14 / 14**	**-**	**1.91E+02**	**N/A**	**2.30E+00 n**	**N/A**		**YES**	**ASL**
	7440-50-8	COPPER	9.00E+00	1.28E+02	mg/kg	PCWLSD03	PCWLSD03-005020	14 / 14	-	1.28E+02	N/A	3.10E+02 n	N/A		NO	BSL
	7439-89-6	**IRON**	**4.93E+03**	**4.02E+04**	**mg/kg**	**PCWLSD03**	**PCWLSD03-000005**	**14 / 14**	**-**	**4.02E+04**	**N/A**	**5.50E+03 n**	**N/A**		**YES**	**ASL**
	7439-92-1	**LEAD**	**1.92E+01 J**	**2.78E+02 J**	**mg/kg**	**PCWLSD02**	**PCWLSD02-005020**	**14 / 14**	**-**	**2.78E+02**	**N/A**	**2.00E+02 n**	**N/A**		**YES**	**ASL**
	7439-95-4	MAGNESIUM	1.34E+03	7.82E+03	mg/kg	PCWLSD02	PCWLSD02-000005	14 / 14	-	7.82E+03	N/A	N/A	N/A		NO	NUT
	7439-96-5	**MANGANESE**	**2.68E+01**	**3.29E+02**	**mg/kg**	**PCWLSD03**	**PCWLSD03-000005**	**14 / 14**	**-**	**3.29E+02**	**N/A**	**1.80E+02 n**	**N/A**		**YES**	**ASL**
	7439-97-6	**MERCURY**	**6.40E-02 J**	**1.30E+00**	**mg/kg**	**PCWLSD04**	**PCWLSD04-000005**	**14 / 14**	**-**	**1.30E+00**	**N/A**	**1.10E+00 n**	**N/A**		**YES**	**ASL**
	7440-02-0	NICKEL	1.37E+01	1.30E+02	mg/kg	PCWLSD03	PCWLSD03-005020	14 / 14	-	1.30E+02	N/A	1.50E+02 n	N/A		NO	BSL
	7440-09-7	POTASSIUM	6.60E+02	5.71E+03	mg/kg	PCWLSD02	PCWLSD02-000005	14 / 14	-	5.71E+03	N/A	N/A	N/A		NO	NUT
	7440-22-4	SILVER	4.10E-01 J	3.10E+00	mg/kg	PCWLSD03;	PCWLSD03-000005; PCWLSD01-	14 / 14	-	3.10E+00	N/A	3.90E+01 n	N/A		NO	BSL
	7440-23-5	SODIUM	3.99E+03 J	1.44E+04	mg/kg	PCWLSD01	PCWLSD01-000005	14 / 14	-	1.44E+04	N/A	N/A	N/A		NO	NUT
	7440-28-0	**THALLIUM**	**1.20E+00 J**	**2.20E+00 J**	**mg/kg**	**PCWLSD03**	**PCWLSD03-000005**	**8 / 14**	**3.0 to 5.8**	**2.20E+00**	**N/A**	**7.80E-02 n**	**N/A**		**YES**	**ASL**
	7440-62-2	**VANADIUM (FUME OR DUST)**	**1.10E+01**	**6.30E+01**	**mg/kg**	**PCWLSD01**	**PCWLSD01-000005**	**14 / 14**	**-**	**6.30E+01**	**N/A**	**3.90E+01 n**	**N/A**		**YES**	**ASL**
	7440-66-6	ZINC	5.90E+01	3.88E+02	mg/kg	PCWLSD01	PCWLSD01-000005	14 / 14	-	3.88E+02	N/A	2.30E+03 n	N/A		NO	BSL
	14913-49-6	**BISMUTH-212**	**5.91E-01 J**	**1.42E+00 J**	**pci/g**	**PCWLSD04**	**PCWLSD04-005020**	**14 / 14**	**-**	**1.42E+00**	**N/A**	**1.71E-01 c**	**N/A**		**YES**	**ASL**
	14733-03-0	**BISMUTH-214**	**4.01E-01 J**	**6.68E-01 J**	**pci/g**	**PCWLSD07**	**PCWLSD07-000005**	**14 / 14**	**-**	**6.68E-01**	**N/A**	**1.48E-01 c**	**N/A**		**YES**	**ASL**
	10045-97-3	CESIUM-137	1.93E-02	3.76E-01	pci/g	PCWLSD02	PCWLSD02-000005	11 / 11	-	3.76E-01	N/A	4.57E-01 c	N/A		NO	BSL
	15092-94-1	**LEAD-212**	**4.62E-01 J**	**1.24E+00 J**	**pci/g**	**PCWLSD06**	**PCWLSD06-005020**	**14 / 14**	**-**	**1.24E+00**	**N/A**	**1.60E-01 c**	**N/A**		**YES**	**ASL**
	15067-28-4	**LEAD-214**	**4.51E-01 J**	**8.14E-01 J**	**pci/g**	**PCWLSD03**	**PCWLSD03-000005**	**14 / 14**	**-**	**8.14E-01**	**N/A**	**1.32E-01 c**	**N/A**		**YES**	**ASL**
	13966-00-2	**POTASSIUM-40**	**4.85E+00**	**1.77E+01**	**pci/g**	**PCWLSD06**	**PCWLSD06-005020**	**14 / 14**	**-**	**1.77E+01**	**N/A**	**1.51E+00 c**	**N/A**		**YES**	**ASL**
	15262-20-1	**RADIUM-228**	**5.35E-01**	**1.28E+00**	**pci/g**	**PCWLSD06**	**PCWLSD06-005020**	**14 / 14**	**-**	**1.28E+00**	**N/A**	**1.00E-01 c**	**N/A**		**YES**	**ASL**
	14913-50-9	**THALLIUM-208**	**1.56E-01 J**	**3.86E-01 J**	**pci/g**	**PCWLSD06**	**PCWLSD06-005020**	**14 / 14**	**-**	**3.86E-01**	**N/A**	**6.61E-02 c**	**N/A**		**YES**	**ASL**
	15117-96-1	URANIUM-235	8.45E-02 J	1.46E-01 J	pci/g	PCWLSD02	PCWLSD02-005020	3 / 6	0.0551 to 0.17	1.46E-01	N/A	4.71E-01 c	N/A		NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening.

[3] Background values not available.

[4] EPA Regional Screening Level (RSL) for residential soil (November 2017) (cancer risk = 1E-06, non-cancer HQ = 0.1)
Radiological PRGs were calculated using the ORNL PRG calculator, using a site area of 14.09 acres (~100,000 m^2) with no cover. Available: https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
RSL for Aroclor-1260 used as a surrogate for Aroclor-1268
RSL value for methyl mercury used for mercury

[5] Rationale Codes

Selection Reason: Above Screening Levels (ASL)
Deletion Reason: Below Screening Level (BSL)
No Screening Value (NTX)
Essential Nutrient (NUT)

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
c = Carcinogenic
n = Noncarcinogenic
J = Estimated Value

mg/kg = milligrams per kilogram
N/A = Not available
pCi/g = picocuries per gram

[6] Total chromium concentrations screened against trivalent chromium RSLs because hexavalent chromium was not detected in the three samples speciated for this valence state. The potential uncertainty associated with the use of the trivalent chromium RSL is discussed in the text.

[7] Dioxinlike PCBs were evaluated as toxicity equivalents (TEQ) to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Organization toxic equivalency factors. Non-detections were assigned a value of 0.

[8] High risk PCBs are those with 4 or more chlorines. The high risk PCB concentration is the sum of the detections for the individual congeners.

[9] Dioxins/furans were evaluated as TEQs to 2,3,7,8-tetrachlorodibenzo-p-dioxin. TEQs were calculated using the 2005 World Health Orgnization toxic equivalency factors. Non-detections were assigned a value of 0.

Table 3.1
Exposure Point Concentration Summary, Surface Soil
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current
Medium: Peck Surface Soil
Exposure Medium: Surface Soil

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/kg	1.24E+06	J-	9.61E+04	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
ANTIMONY	mg/kg	1.85E+03		3.45E+01	KM H-UCL	Data are lognormally distributed
ARSENIC	mg/kg	9.68E+01		1.47E+01	95% H-UCL	Data are lognormally distributed
BARIUM	mg/kg	1.95E+03		4.29E+02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CADMIUM	mg/kg	1.32E+02	J-	2.01E+01	95% KM Approximate Gamma UCL	Data are gamma distributed
CHROMIUM	mg/kg	8.15E+03		3.59E+02	95% H-UCL	Data are lognormally distributed
CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	4.74E+01		1.76E+01	95% KM (Chebyshev) UCL	Data are nonparametric
COBALT	mg/kg	5.43E+03		1.63E+02	KM H-UCL	Data are lognormally distributed
COPPER	mg/kg	1.83E+05	J-	6.54E+03	95% H-UCL	Data are lognormally distributed
IRON	mg/kg	1.58E+06	J-	1.64E+05	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD	mg/kg	1.21E+05		2.79E+03	Average Concentration	Average detection used for blood lead modeling
MANGANESE	mg/kg	1.86E+03	J	6.76E+02	95% H-UCL	Data are lognormally distributed
MERCURY	mg/kg	2.94E+01	J-	7.66E+00	KM H-UCL	Data are lognormally distributed
NICKEL	mg/kg	3.25E+03		3.58E+02	95% KM Approximate Gamma UCL	Data are gamma distributed
SILVER	mg/kg	1.11E+02	J-	9.74E+00	95% KM (Chebyshev) UCL	Data are nonparametric
THALLIUM	mg/kg	1.03E+01		1.03E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
VANADIUM	mg/kg	1.82E+03		2.57E+02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
ZINC	mg/kg	1.27E+05	J-	7.72E+03	95% H-UCL	Data are lognormally distributed
BENZO[A]ANTHRACENE	mg/kg	1.54E+01		1.90E+00	95% KM (Chebyshev) UCL	Data are nonparametric
BENZO[A]PYRENE	mg/kg	1.20E+01		1.73E+00	95% KM (Chebyshev) UCL	Data are nonparametric
BENZO[B]FLUORANTHENE	mg/kg	1.91E+01		2.16E+00	95% KM (Chebyshev) UCL	Data are nonparametric
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	1.80E+02		1.42E+01	95% KM (Chebyshev) UCL	Data are nonparametric
DIBENZ[A,H]ANTHRACENE	mg/kg	3.10E+00		5.29E-01	95% KM (Chebyshev) UCL	Data are nonparametric
INDENO[1,2,3-CD]PYRENE	mg/kg	9.50E+00		1.17E+00	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1248	mg/kg	2.40E+01	J+	4.66E+00	95% GROS Approximate Gamma UCL	Data are gamma distributed
AROCLOR-1254	mg/kg	2.40E+00	J	2.40E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1260	mg/kg	3.20E+01		6.16E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
TEQ for PCB Congeners	mg/kg	2.36E-04		2.36E-04	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
High Risk PCBs	mg/kg	1.17E+01		1.17E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	mg/kg	7.15E-04		5.12E-04	95% Adjusted Gamma UCL	Data are gamma distributed
BISMUTH-212	pCi/g	1.60E+00	J	1.06E+00	95% KM (t) UCL	Data are normally distributed

Table 3.1
Exposure Point Concentration Summary, Surface Soil
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current
Medium: Peck Surface Soil
Exposure Medium: Surface Soil

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BISMUTH-214	pCi/g	5.50E+02	J	2.06E+02	97.5% Chebyshev(Mean, Sd) UCL	Data are nonparametric
CESIUM-137	pCi/g	2.47E-01		1.04E-01	95% KM (t) UCL	Data are approximately normally distributed
LEAD-210	pCi/g	3.53E+02	J	3.89E+02	99% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD-212	pCi/g	1.42E+00	J	8.09E-01	95% KM (t) UCL	Data are approximately normally distributed
LEAD-214	pCi/g	5.96E+02	J	2.27E+02	97.5% Chebyshev (Mean, Sd) UCL	Data are nonparametric
POTASSIUM-40	pCi/g	1.77E+01		9.42E+00	95% Student's-t UCL	Data are approximately normally distributed
PROTACTINIUM-234M	pCi/g	2.73E+00	J	2.73E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/g	2.67E+00	J	2.25E+00	95% Student's-t UCL	Data are normally distributed
RADIUM-228	pCi/g	1.44E+00		8.78E-01	95% KM (t) UCL	Data are normally distributed
THALLIUM-208	pCi/g	4.35E-01	J	2.74E-01	95% Student's-t UCL	Data are normally distributed
THORIUM-234	pCi/g	1.29E+00	J	1.12E+00	95% KM (t) UCL	Data are normally distributed
URANIUM-235	pCi/g	2.15E-01	J	2.15E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.2
Exposure Point Concentration Summary, Combined Soil
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	mg/kg	1.24E+06	J-	3.24E+04	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
ANTIMONY	mg/kg	1.85E+03		2.72E+01	KM H-UCL	Data are lognormally distributed
ARSENIC	mg/kg	1.61E+02	J	1.38E+01	KM H-UCL	Data are lognormally distributed
BARIUM	mg/kg	2.53E+03		3.38E+02	95% KM (Chebyshev) UCL	Data are nonparametric
BERYLLIUM	mg/kg	2.43E+01		1.80E+00	95% KM (Chebyshev) UCL	Data are nonparametric
CADMIUM	mg/kg	2.12E+02		1.97E+01	95% KM (Chebyshev) UCL	Data are nonparametric
CHROMIUM	mg/kg	1.13E+05		2.18E+03	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	1.80E+02		4.94E+00	KM H-UCL	Data are approximately lognormally distributed
COBALT	mg/kg	2.93E+04		1.70E+02	KM H-UCL	Data are lognormally distributed
COPPER	mg/kg	1.83E+05	J-	4.90E+03	95% KM (Chebyshev) UCL	Data are nonparametric
CYANIDE	mg/kg	9.20E+00		3.77E-01	KM H-UCL	Data are approximately lognormally distributed
IRON	mg/kg	1.58E+06	J-	7.41E+04	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD	mg/kg	1.21E+05		1.61E+03	Average Concentration	Average detection used for blood lead modeling
MANGANESE	mg/kg	2.66E+03		4.62E+02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
MERCURY	mg/kg	9.33E+01		4.58E+00	95% KM (Chebyshev) UCL	Data are nonparametric
NICKEL	mg/kg	1.82E+04		5.73E+02	95% KM (Chebyshev) UCL	Data are nonparametric
SELENIUM	mg/kg	6.82E+01		3.63E+00	95% KM Approximate Gamma UCL	Data are approximately gamma distributed
SILVER	mg/kg	1.36E+02		4.33E+00	KM H-UCL	Data are lognormally distributed
THALLIUM	mg/kg	8.45E+01	J	4.17E+00	95% KM Approximate Gamma UCL	Data are approximately gamma distributed
VANADIUM	mg/kg	1.82E+03		9.90E+01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
ZINC	mg/kg	1.27E+05	J-	5.09E+03	95% KM (Chebyshev) UCL	Data are nonparametric
1,2,4-TRICHLOROBENZENE	mg/kg	3.60E+01		4.86E-03	KM H-UCL	Data are approximately lognormally distributed
1,4-DICHLOROBENZENE	mg/kg	3.50E+01		9.74E-01	95% KM Approximate Gamma UCL	Data are gamma distributed
CHLOROBENZENE	mg/kg	3.40E+01		3.40E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
BENZO[A]ANTHRACENE	mg/kg	1.54E+01		9.39E-01	95% KM (Chebyshev) UCL	Data are nonparametric
BENZO[A]PYRENE	mg/kg	1.20E+01		8.48E-01	95% KM (Chebyshev) UCL	Data are nonparametric
BENZO[B]FLUORANTHENE	mg/kg	1.91E+01		6.29E-01	KM H-UCL	Data are approximately lognormally distributed
BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	1.80E+02		4.92E+00	95% KM (Chebyshev) UCL	Data are nonparametric
DIBENZ[A,H]ANTHRACENE	mg/kg	3.10E+00		2.28E-01	95% KM (Chebyshev) UCL	Data are nonparametric
INDENO[1,2,3-CD]PYRENE	mg/kg	9.50E+00		5.18E-01	95% KM (Chebyshev) UCL	Data are nonparametric
4,4'-DDT	mg/kg	1.10E+01		3.53E-03	KM H-UCL	Data are lognormally distributed

Table 3.2
Exposure Point Concentration Summary, Combined Soil
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
DIELDRIN	mg/kg	1.70E+00	J	2.28E-03	KM H-UCL	Data are approximately lognormally distributed
HEPTACHLOR EPOXIDE	mg/kg	3.90E-01	J	9.11E-03	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1248	mg/kg	4.30E+03	J	8.73E+01	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1254	mg/kg	2.10E+03		5.81E+01	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1260	mg/kg	8.60E+02		2.74E+01	KM H-UCL	Data are approximately lognormally distributed
TEQ for PCB Congeners	mg/kg	1.64E-03		9.66E-04	99% Chebyshev (Mean, Sd) UCL	Data are lognormally distributed; selected nonparametric UCL recommended by ProUCL
High Risk PCBs	mg/kg	1.39E+03		7.29E+02	99% Chebyshev (Mean, Sd) UCL	Data are lognormally distributed; selected nonparametric UCL recommended by ProUCL
2,3,7,8-TCDD TEQ	mg/kg	1.20E-03		2.90E-04	95% Adjusted Gamma UCL	Data are gamma distributed
BISMUTH-212	pCi/g	1.60E+00	J	1.04E+00	95% KM (t) UCL	Data are normally distributed
BISMUTH-214	pCi/g	5.50E+02	J	1.69E+02	97.5% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CESIUM-137	pCi/g	2.47E-01		9.42E-02	95% KM (t) UCL	Data are approximately normally distributed
LEAD-210	pCi/g	3.53E+02	J	2.19E+02	99% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD-212	pCi/g	1.42E+00	J	8.15E-01	95% KM (t) UCL	Data are normally distributed
LEAD-214	pCi/g	5.96E+02	J	1.86E+02	97.5% Chebyshev(Mean, Sd) UCL	Data are nonparametric
POTASSIUM-40	pCi/g	1.77E+01		9.15E+00	95% Adjusted Gamma UCL	Data are gamma distributed
PROTACTINIUM-234M	pCi/g	2.73E+00	J	2.73E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/g	1.24E+02		3.49E+01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
RADIUM-228	pCi/g	1.44E+00		8.46E-01	95% KM (t) UCL	Data are approximately normally distributed
THALLIUM-208	pCi/g	4.35E-01	J	2.71E-01	95% Student's-t UCL	Data are normally distributed
THORIUM-234	pCi/g	1.76E+00	J	1.08E+00	95% KM (t) UCL	Data are normally distributed
URANIUM-235	pCi/g	2.15E-01	J	1.16E-01	95% KM (t) UCL	Data are approximately normally distributed

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.3
Exposure Point Concentration Summary, Soil to Air (Combined Surface and Subsurface Soil)
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	µg/m^3	2.81E+02	J-	7.33E+00	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
ARSENIC	µg/m^3	3.65E-02	J	3.13E-03	KM H-UCL	Data are lognormally distributed
BARIUM	µg/m^3	5.72E-01		7.66E-02	95% KM (Chebyshev) UCL	Data are nonparametric
BERYLLIUM	µg/m^3	5.50E-03		4.07E-04	95% KM (Chebyshev) UCL	Data are nonparametric
CADMIUM	µg/m^3	4.80E-02		4.45E-03	95% KM (Chebyshev) UCL	Data are nonparametric
CHROMIUM	µg/m^3	2.56E+01		4.93E-01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CHROMIUM (HEXAVALENT COMPOUNDS)	µg/m^3	4.08E-02		1.12E-03	KM H-UCL	Data are approximately lognormally distributed
COBALT	µg/m^3	6.64E+00		3.84E-02	KM H-UCL	Data are lognormally distributed
MANGANESE	µg/m^3	6.02E-01		1.05E-01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
NICKEL	µg/m^3	4.12E+00		1.30E-01	95% KM (Chebyshev) UCL	Data are nonparametric
VANADIUM	µg/m^3	4.12E-01		2.24E-02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
1,2,4-TRICHLOROBENZENE	µg/m^3	1.09E+01		1.48E-03	KM H-UCL	Data are approximately lognormally distributed
1,4-DICHLOROBENZENE	µg/m^3	3.05E+01		8.48E-01	95% KM Approximate Gamma UCL	Data are gamma distributed
CHLOROBENZENE	µg/m^3	4.79E+01		4.79E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
BENZO[A]PYRENE	µg/m^3	2.72E-03		1.92E-04	95% KM (Chebyshev) UCL	Data are nonparametric
NAPHTHALENE	µg/m^3	7.46E-01		4.46E-02	95% KM (Chebyshev) UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
AROCLOR-1248	µg/m^3	6.35E+01	J	1.29E+00	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1254	µg/m^3	2.31E+01		6.40E-01	95% KM (Chebyshev) UCL	Data are nonparametric
AROCLOR-1260	µg/m^3	6.14E+00		1.96E-01	KM H-UCL	Data are approximately lognormally distributed
TEQ for PCB Congeners	µg/m^3	7.96E-06		4.69E-06	99% Chebyshev (Mean, Sd) UCL	Data are lognormally distributed; selected nonparametric UCL recommended by ProUCL
High Risk PCBs	µg/m^3	2.42E+01		1.26E+01	99% Chebyshev (Mean, Sd) UCL	Data are lognormally distributed; selected nonparametric UCL recommended by ProUCL
2,3,7,8-TCDD TEQ	µg/m^3	5.84E-06		1.41E-06	95% Adjusted Gamma UCL	Data are gamma distributed

Table 3.3
Exposure Point Concentration Summary, Soil to Air (Combined Surface and Subsurface Soil)
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface)
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
BISMUTH-214	pCi/g	--		1.69E+02	97.5% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD-210	pCi/g	--		2.19E+02	99% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD-214	pCi/g	--		1.86E+02	97.5% Chebyshev(Mean, Sd) UCL	Data are nonparametric
PROTACTINIUM-234M	pCi/g	--		2.73E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/g	--		3.49E+01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
RADIUM-228	pCi/g	--		8.46E-01	95% KM (t) UCL	Data are approximately normally distributed
THORIUM-234	pCi/g	--		1.08E+00	95% KM (t) UCL	Data are normally distributed
URANIUM-235	pCi/g	--		1.16E-01	95% KM (t) UCL	Data are approximately normally distributed

J = Estimated Value
$\mu g/m^3$ = micrograms per cubic meter
pCi/g = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration
-- = not applicable, inhalation risks for radiological compounds are evaluated using EPA calculator generated PRGs, which are in soil units and do not require an estimation of the air concentration

Table 3.4
Exposure Point Concentration Summary, Freshwater Wetlands Sediment
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	2.51E+01		1.82E+01	95% H-UCL	Data are lognormally distributed
CHROMIUM	mg/kg	2.80E+01		2.02E+01	95% Adjusted Gamma UCL	Data are gamma distributed
BISMUTH-212	pCi/g	9.64E-01	J	8.47E-01	95% Student's-t UCL	Data are normally distributed
BISMUTH-214	pCi/g	1.37E+00	J	9.25E-01	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
LEAD-212	pCi/g	7.82E-01	J	7.27E-01	95% Student's-t UCL	Data are normally distributed
LEAD-214	pCi/g	1.52E+00	J	1.04E+00	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
POTASSIUM-40	pCi/g	8.85E+00		7.90E+00	95% Student's-t UCL	Data are normally distributed
RADIUM-226	pCi/g	2.64E+00	J	1.79E+00	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
RADIUM-228	pCi/g	8.23E-01		7.40E-01	95% Student's-t UCL	Data are normally distributed
THALLIUM-208	pCi/g	2.57E-01	J	2.31E-01	95% Student's-t UCL	Data are normally distributed
THORIUM-234	pCi/g	1.16E+00	J	7.77E-01	95% Student's-t UCL	Data are approximately normally distributed

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.5
Exposure Point Concentration Summary, Freshwater Wetlands Sediment to Air
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Ambient Air during Excavation Activities
Exposure Point: Site

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	ug/m^3	2.25E-04		1.63E-04	95% H-UCL	Data are lognormally distributed
CHROMIUM (HEXAVALENT COMPOUNDS)	ug/m^3	2.51E-04		1.81E-04	95% Adjusted Gamma UCL	Data are gamma distributed
MANGANESE	ug/m^3	2.18E-03		1.90E-03	95% Adjusted Gamma UCL	Data are gamma distributed
BISMUTH-214	pCi/g	--		9.25E-01	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
LEAD-210	pCi/g	--		1.02E+00	95% Student's-t UCL	Data are approximately normally distributed
LEAD-214	pCi/g	--		1.04E+00	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
RADIUM-226	pCi/g	--		1.79E+00	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
RADIUM-228	pCi/g	--		7.40E-01	95% Student's-t UCL	Data are normally distributed
THORIUM-234	pCi/g	--		7.77E-01	95% Student's-t UCL	Data are approximately normally distributed

J = Estimated Value
µg/m^3 = micrograms per cubic meter
pCi/g = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration
-- = not applicable, inhalation risks for radiological compounds are evaluated using EPA calculator generated PRGs, which are in soil units and do not require an estimation of the air concentration

Table 3.6
Exposure Point Concentration Summary, Estuarine Wetlands Sediment
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ANTIMONY	mg/kg	4.47E+02	J-	3.90E+01	95% KM (Chebyshev) UCL	Data are nonparametric
ARSENIC	mg/kg	1.23E+02		2.32E+01	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CHROMIUM	mg/kg	4.00E+04		5.10E+03	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	4.45E+01		4.45E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COBALT	mg/kg	3.44E+04	J-	4.35E+03	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
COPPER	mg/kg	5.58E+03		6.22E+02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
IRON	mg/kg	2.91E+05	J-	4.96E+04	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD	mg/kg	3.60E+03		2.76E+02	Average Concentration	Average detection used for blood lead modeling
MERCURY	mg/kg	1.00E+02		9.16E+00	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
NICKEL	mg/kg	5.67E+04	J-	5.38E+03	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
THALLIUM	mg/kg	6.31E+01	J-	6.58E+00	95% KM (Chebyshev) UCL	Data are nonparametric
BENZO[A]ANTHRACENE	mg/kg	2.40E+01		2.16E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
BENZO[A]PYRENE	mg/kg	2.00E+01		1.70E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
BENZO[B]FLUORANTHENE	mg/kg	1.90E+01		1.68E+00	95% KM Approximate Gamma UCL	Data are approximately gamma distributed
DIBENZ[A,H]ANTHRACENE	mg/kg	4.00E+00		4.00E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1248	mg/kg	5.60E+00	J+	5.60E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1254	mg/kg	1.40E+01		1.29E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
AROCLOR-1260	mg/kg	1.60E+01	J+	1.61E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
2,3,7,8-TCDD TEQ	mg/kg	9.71E-05		3.46E-05	95% Chebyshev(Mean, Sd) UCL	Data are lognormally distributed; selected nonparametric UCL recommended by ProUCL
BISMUTH-212	pCi/g	1.42E+00	J	1.21E+00	95% Student's-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
BISMUTH-214	pCi/g	1.18E+00	J	6.20E-01	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
LEAD-212	pCi/g	1.24E+00	J	9.77E-01	95% Student's-t UCL	Data are normally distributed
LEAD-214	pCi/g	1.40E+00	J	7.26E-01	95% Modified-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL
POTASSIUM-40	pCi/g	1.86E+01		1.52E+01	95% Student's-t UCL	Data are approximately normally distributed
RADIUM-226	pCi/g	2.77E+00	J	9.93E-01	95% KM (t) UCL	Data are approximately normally distributed
RADIUM-228	pCi/g	1.99E+00	J	9.81E-01	95% KM (t) UCL	Data are approximately normally distributed
THALLIUM-208	pCi/g	3.86E-01	J	3.24E-01	95% Student's-t UCL	Data are nonparametric; selected normal distribution UCL recommended by ProUCL

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.7
Exposure Point Concentration Summary, Estuarine Wetlands Sediment to Air
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CHROMIUM	□g/m^3	3.58E-01		4.57E-02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CHROMIUM (HEXAVALENT COMPOUNDS)	□g/m^3	3.99E-04		3.99E-04	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COBALT	□g/m^3	3.08E-01	J-	3.89E-02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
MERCURY	µg/m^3	5.05E+01		4.63E+00	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
NICKEL	µg/m^3	5.08E-01	J-	4.82E-02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
AROCLOR-1248	µg/m^3	2.35E-02	J+	2.35E-02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1254	µg/m^3	4.36E-02		4.01E-03	95% KM Approximate Gamma UCL	Data are gamma distributed
AROCLOR-1260	µg/m^3	3.20E-02	J+	3.21E-03	95% KM Approximate Gamma UCL	Data are gamma distributed

J = Estimated Value
µg/m^3 = micrograms per cubic meter
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.8
Exposure Point Concentration Summary, Estuarine Wetlands Surface Water
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	ug/L	5.90E+00	J	5.90E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM	ug/L	1.36E+02	J	1.36E+02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COBALT	ug/L	2.61E+02		2.61E+02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CYANIDE	ug/L	3.60E+00	J	3.60E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
IRON	ug/L	9.30E+02		9.30E+02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
THALLIUM	ug/L	2.30E+00	J	2.30E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
TEQ for PCB Congeners	ug/L	4.83E-06		4.83E-06	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
High Risk PCBs	ug/L	2.35E-01		2.35E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	ug/L	1.20E-06		1.20E-06	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/L	5.10E+01		5.10E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.9
Exposure Point Concentration Summary, North Drainage Channel Sediment
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	3.00E+01		3.00E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM	mg/kg	5.43E+01		5.43E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COBALT	mg/kg	5.25E+01		5.25E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
THALLIUM	mg/kg	5.50E+00		5.50E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
BENZO[A]PYRENE	mg/kg	3.40E+00	J	3.40E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	mg/kg	2.86E-04		2.86E-04	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/g	6.12E-01	J	6.12E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-228	pCi/g	5.72E-01	J	5.72E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.10
Exposure Point Concentration Summary, Northern Drainage Channel Sediment to Air
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CHROMIUM	µg/m^3	4.87E-04		4.87E-04	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
MERCURY	µg/m^3	6.57E-01		6.57E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	µg/m^3	3.84E-07		3.84E-07	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
µg/m^3 = micrograms per cubic meter
pCi/g = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration
-- = not applicable, inhalation risks for radiological compounds are evaluated using EPA calculator generated PRGs, which are in soil units and do not require an estimation of the air concentration

Table 3.11
Exposure Point Concentration Summary, North Drainage Channel Surface Water
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	ug/L	5.90E+00	J	5.90E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM	ug/L	1.35E+01	J	1.35E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
IRON	ug/L	1.13E+04		1.13E+04	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
LEAD	ug/L	1.82E+01	J	1.82E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
THALLIUM	ug/L	2.20E+00	J	2.20E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	ug/L	1.73E-05		1.73E-05	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
RADIUM-226	pCi/L	2.48E+01	J	2.48E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
ug/L = micrograms per liter
pCi/L = picocuries per liter
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.12
Exposure Point Concentration Summary, Paradise Creek River Sediment
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	2.21E+01	J	1.37E+01	95% Student's-t UCL	Data are nonparametric
CHROMIUM	mg/kg	1.11E+03		3.21E+02	95% H-UCL	Data are lognormally distributed
COBALT	mg/kg	6.12E+02		1.72E+02	95% Adjusted Gamma UCL	Data are gamma distributed
THALLIUM	mg/kg	2.00E+00	J	1.68E+00	KM H-UCL	Data are nonparametric
BENZO[A]PYRENE	mg/kg	1.60E+00		6.13E-01	95% KM Adjusted Gamma UCL	Data are approximately gamma distributed
TEQ for PCB Congeners	mg/kg	9.62E-05		9.62E-05	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	mg/kg	5.41E-05		2.39E-05	95% Student's-t UCL	Data are normally distributed
BISMUTH-212	pCi/g	1.58E+00	J	1.17E+00	95% Student's-t UCL	Data are normally distributed
BISMUTH-214	pCi/g	9.08E-01	J	7.01E-01	95% Student's-t UCL	Data are normally distributed
CESIUM-137	pCi/g	4.67E-01		1.90E-01	95% Adjusted Gamma UCL	Data are gamma distributed
LEAD-212	pCi/g	1.23E+00	J	9.54E-01	95% Student's-t UCL	Data are normally distributed
LEAD-214	pCi/g	1.04E+00	J	8.11E-01	95% Student's-t UCL	Data are approximately normally distributed
POTASSIUM-40	pCi/g	1.88E+01		1.47E+01	95% Student's-t UCL	Data are normally distributed
RADIUM-228	pCi/g	1.38E+00		1.05E+00	95% Student's-t UCL	Data are normally distributed
THALLIUM-208	pCi/g	4.14E-01	J	3.17E-01	95% Student's-t UCL	Data are normally distributed

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.13
Exposure Point Concentration Summary, Paradise Creek Sediment to Air
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Ambient Air During Excavation Activities
Exposure Point: Sediment

Chemical of Potential Concern	Units	Maximum Estimated Air Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
CHROMIUM	µg/m^3	9.95E-03		2.87E-03	95% H-UCL	Data are lognormally distributed
COBALT	µg/m^3	5.48E-03		1.54E-03	95% Adjusted Gamma UCL	Data are gamma distributed
MERCURY	µg/m^3	7.58E-01		3.49E-01	95% Student's-t UCL	Data are approximately normally distributed

J = Estimated Value
µg/m^3 = micrograms per cubic meter
pCi/g = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration
-- = not applicable, inhalation risks for radiological compounds are evaluated using EPA calculator generated PRGs, which are in soil units and do not require an estimation of the air concentration

Table 3.14
Exposure Point Concentration Summary, Paradise Creek River Surface Water
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	ug/L	5.70E+00	J	5.70E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM	ug/L	3.85E+00	J	2.59E+00	95% KM (t) UCL	Data are normally distributed
IRON	ug/L	9.63E+02	J	7.66E+02	95% Student's-t UCL	Data are normally distributed
THALLIUM	ug/L	3.80E+00	J	3.36E+00	95% KM (t) UCL	Data are normally distributed
High Risk PCBs	ug/L	2.24E-03		2.24E-03	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	ug/L	8.14E-07		8.14E-07	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
POTASSIUM-40	pCi/L	1.94E+02		1.66E+02	95% Student's-t UCL	Data are normally distributed

J = Estimated Value
ug/L = micrograms per liter
pCi/L = picocuries per liter
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.15
Exposure Point Concentration Summary, Paradise Creek River Fish Tissue
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Fish Tissue
Exposure Medium: Fish

Chemical of Potential Concern	Units	Maximum Estimated Fish Tissue Concentration	Reasonable Maximum Exposure		
			Medium EPC Value[1]	Medium EPC Statistic	Medium EPC Rationale
4,4'-DDD	mg/kg	1.30E-02	1.30E-02	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
4,4'-DDE	mg/kg	7.01E-02	2.10E-02	95% KM (t) UCL	Data are normally distributed
4,4'-DDT	mg/kg	1.39E-01	1.39E-01	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
CHLORDANE	mg/kg	7.81E-02	7.81E-02	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
DIELDRIN [2]	mg/kg	2.30E-03	2.30E-03	Maximum Mummichog Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1254	mg/kg	8.03E-02	8.03E-02	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
TEQ for PCB Congeners	mg/kg	2.82E-06	2.82E-06	Maximum Detected Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
High Risk PCBs	mg/kg	8.84E-01	8.84E-01	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ [3]	mg/kg	7.89E-05	7.89E-05	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
ALUMINUM	mg/kg	2.63E+02	2.63E+02	Maximum Mummichog Fish Tissue Concentration	Mummichog Tissue > Modeled Fish Tissue Concentration
ARSENIC	mg/kg	1.71E+00	1.71E+00	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM (HEXAVALENT)	mg/kg	2.34E-02	2.34E-02	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
COBALT	mg/kg	2.50E-01	2.50E-01	Maximum Mummichog Fish Tissue Concentration	Mummichog Tissue > Modeled Fish Tissue Concentration
COPPER	mg/kg	1.39E+01	5.58E+00	95% Adjusted Gamma UCL	Data are gamma distributed
IRON	mg/kg	2.99E+02	2.99E+02	Maximum Mummichog Fish Tissue Concentration	Mummichog Tissue > Modeled Fish Tissue Concentration
LEAD	mg/kg	1.22E+01	6.78E+00	Average Estimated Fish Tissue Concentration	Average concentration used in blood lead modeling
MANGANESE	mg/kg	4.78E+01	1.06E+01	95% Student's-t UCL	Data are normally distributed
SELENIUM	mg/kg	1.00E+00	1.00E+00	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
ZINC	mg/kg	4.81E+02	1.87E+02	95% Adjusted Gamma UCL	Data are gamma distributed
BISMUTH-214	pCi/g	2.27E-01	1.75E-01	95% Student's-t UCL	Sediment data are normally distributed
CESIUM-137	pCi/g	1.17E-01	4.75E-02	95% Adjusted Gamma UCL	Sediment data are gamma distributed
LEAD-214	pCi/g	4.20E-02	2.03E-01	95% Student's-t UCL	Sediment data are approximately normally distributed
POTASSIUM-40	pCi/g	4.70E+00	3.68E+00	95% Student's-t UCL	Sediment data are normally distributed
RADIUM-228	pCi/g	3.45E-01	2.61E-01	95% Student's-t UCL	Sediment data are normally distributed
STRONTIUM-90	pCi/g	1.20E-01	1.20E-01	Maximum Estimated Fish Tissue Concentration	Insufficient detections (< 8) to calculate 95% UCL
URANIUM-235	pCi/g	4.10E-02	3.40E-02	95% KM(t) UCL	Sediment detections are normally distributed

[1] = Fish tissue concentrations are estimated using sediment or surface water data. A 95% UCL was calculated as the EPC if the sediment or surface water detection frequency was sufficient (> 7 detections) and the 95% UCL was used to estimate fish tissue concentrations.
[2] = Dieldrin not detected in sediment or surface water; used the maximum mummichog tissue concentration.
[3] estimated from surface water concentration, which provided the highest estimated fish tissue concentration

mg/kg = milligrams per kilogram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.16
Exposure Point Concentration Summary, Paradise Creek River Shellfish Tissue
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Shellfish Tissue
Exposure Medium: Shellfish

Chemical of Potential Concern	Units	Maximum Detected or Estimated Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ARSENIC	mg/kg	7.90E-01		7.90E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CADMIUM	mg/kg	4.00E-01	J	4.00E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	5.20E-01	J	5.20E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COBALT	mg/kg	2.75E-01	J	2.75E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
COPPER	mg/kg	4.83E+01		4.83E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
IRON	mg/kg	1.51E+02		1.51E+02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
LEAD	mg/kg	4.60E-01	J	4.60E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
MERCURY	mg/kg	1.30E-01		1.30E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
ZINC	mg/kg	1.22E+03		1.22E+03	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
BENZO[B]FLUORANTHENE	mg/kg	2.10E-01	J	2.10E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
4,4'-DDD	mg/kg	1.20E-02	J	1.20E-02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
4,4'-DDE	mg/kg	3.15E-02		3.15E-02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
ALDRIN	mg/kg	1.90E-03	J	1.90E-03	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
DIELDRIN	mg/kg	3.30E-03	J	3.30E-03	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
HEPTACHLOR EPOXIDE	mg/kg	3.15E-03	J	3.15E-03	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
AROCLOR-1254	mg/kg	6.30E-02	J	6.30E-02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
HIGH RISK PCBS	mg/kg	1.54E-01		1.54E-01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
DIOXINLIKE PCBS TEQ	mg/kg	5.65E-06		5.65E-06	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
2,3,7,8-TCDD TEQ	mg/kg	1.67E-06		1.67E-06	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
BISMUTH-214	pCi/g	2.00E-01		1.54E-01	95% Student's-t UCL	Sediment data are normally distributed
CESIUM-137	pCi/g	1.03E-01		4.18E-02	95% Adjusted Gamma UCL	Sediment data are gamma distributed
LEAD-214	pCi/g	6.91E-02		5.45E-02	95% Student's-t UCL	Sediment data are approximately normally distributed
POTASSIUM-40	pCi/g	4.14E+00		3.23E+00	95% Student's-t UCL	Sediment data are normally distributed
RADIUM-228	pCi/g	3.04E-01		2.30E-01	95% Student's-t UCL	Sediment data are normally distributed
STRONTIUM-90	pCi/g	1.06E-01		1.06E-01	Maximum Estimated Concentration	Insufficient detections (< 8) to calculate 95% UCL
URANIUM-235	pCi/g	3.61E-02		2.99E-02	95% KM(t) UCL	Sediment detections are normally distributed

J = Estimated Value
mg/kg = milligrams per kilogram
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.17
Exposure Point Concentration Summary, Groundwater
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM	ug/L	5.73E+03		7.96E+02	95% KM (Chebyshev) UCL	Data are nonparametric
ANTIMONY	ug/L	1.94E+01	J	1.94E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
ARSENIC	ug/L	4.12E+01		1.44E+01	95% KM (Chebyshev) UCL	Data are nonparametric
BARIUM	ug/L	1.42E+03		3.24E+02	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
CADMIUM	ug/L	7.20E+00		7.47E-01	95% KM Approximate Gamma UCL	Data are gamma distributed
CHROMIUM	ug/L	2.06E+02		4.40E+00	KM H-UCL	Data are lognormally distributed
CHROMIUM (HEXAVALENT COMPOUNDS)	ug/L	1.20E+02	J-	1.25E+01	95% KM Approximate Gamma UCL	Data are gamma distributed
COBALT	ug/L	5.50E+02		4.82E+01	95% KM (Chebyshev) UCL	Data are nonparametric
CYANIDE	ug/L	2.67E+02		1.53E+01	95% KM Approximate Gamma UCL	Data are approximately gamma distributed
IRON	ug/L	7.41E+04		1.75E+04	95% GROS Approximate Gamma UCL	Data are gamma distributed
LEAD	ug/L	4.70E+01		5.81E+00	95% KM (Chebyshev) UCL	Data are nonparametric
MANGANESE	ug/L	1.51E+03		3.91E+02	95% Approximate Gamma UCL	Data are gamma distributed
MERCURY	ug/L	1.10E+00		1.70E-01	95% KM Approximate Gamma UCL	Data are approximately gamma distributed
NICKEL	ug/L	2.10E+02		2.11E+01	KM H-UCL	Data are lognormally distributed
SELENIUM	ug/L	4.91E+01		8.48E+00	95% KM (Chebyshev) UCL	Data are lognormally distributed
THALLIUM	ug/L	1.05E+01	J	1.05E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
VANADIUM	ug/L	1.90E+01		3.59E+00	95% KM Approximate Gamma UCL	Data are gamma distributed
NAPHTHALENE	ug/L	1.30E+00	J	1.30E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
1,4-DICHLOROBENZENE	ug/L	2.30E+00	J	2.30E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CHLOROBENZENE	ug/L	4.10E+01		4.10E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
CIS-1,2-DICHLOROETHENE	ug/L	4.50E+01	J	9.29E+00	95% KM (Chebyshev) UCL	Data are nonparametric
VINYL CHLORIDE	ug/L	5.10E+00		5.10E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
TEQ for PCB Congeners	ug/L	3.23E-07		1.15E-07	95% Adjusted Gamma UCL	Data are gamma distributed
High Risk PCBs	ug/L	1.24E-01		5.77E-02	95% Student's-t UCL	Data are approximately normally distributed
2,3,7,8-TCDD TEQ	ug/L	1.20E-05		4.58E-06	99% KM (Chebyshev) UCL	Data are nonparametric
BISMUTH-214	pCi/L	1.01E+01	J	1.01E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
LEAD-210	pCi/L	3.16E+01	J	3.16E+01	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
LEAD-212	pCi/L	8.50E+00	J	3.34E+00	95% KM (t) UCL	Data are normally distributed
LEAD-214	pCi/L	7.91E+00	J	7.91E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
POTASSIUM-40	pCi/L	1.60E+02		3.99E+01	KM H-UCL	Data are approximately lognormally distributed
RADIUM-226	pCi/L	1.03E+02		1.03E+02	Maximum Detection	See Text (Section 1.4)
RADIUM-228	pCi/L	5.69E+00	J	5.69E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL
STRONTIUM-90	pCi/L	1.52E+00		1.52E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

J = Estimated Value
mg/L = milligrams per liter
PCI/L = picocuries per liter
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.18
Exposure Point Concentration Summary, Wipe Samples
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Building Surfaces
Exposure Medium: Dust

Chemical of Potential Concern	Units[1]	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
LEAD	µg/cm^2	3.51E+00		2.33E+00	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
AROCLOR-1260	µg/cm^2	2.79E+02	J	2.79E+02	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL

[1] Sample results were originally reported in ug/wipe and were converted to ug/cm2.
µg/cm^2 = micrograms per cubic centimeter
J = Estimated Value
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.19
Exposure Point Concentration Summary, Indoor Air via Vapor Intrusion, Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

Chemical of Potential Concern	Units	Reasonable Maximum Exposure				
		Groundwater Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Air Medium EPC Value[1]	Units
VINYL CHLORIDE	µg/L	5.10E+00	Maximum Detection	Insufficient detections (< 8) to calculate 95% UCL	5.80E+00	µg/m^3
CYANIDE	µg/L	1.53E+01	95% KM Approximate Gamma UCL	Data are approximately gamma distributed	6.37E-02	µg/m^3
MERCURY	µg/L	1.70E-01	95% KM Approximate Gamma UCL	Data are approximately gamma distributed	5.98E-02	µg/m^3

[1] = The EPC for indoor air was calculated using EPA's VISL calculator
µg/L = micrograms per liter
PCI/L = picocuries per liter
UCL = upper confidence limit
EPC = exposure point concentration

Table 3.20
Exposure Point Concentration Summary, Air Inside an Open Excavation Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Air Inside an Open Excavation

Chemical of Potential Concern	Units	Reasonable Maximum Exposure				
		Groundwater Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale	Air Medium EPC Value[1]	Units
CYANIDE	ug/L	1.53E+01	95% KM Approximate Gamma UCL	Data are approximately gamma distributed	1.45E+02	µg/m^3

[1] = The EPC for air inside an open excavation was calculated using Virginia DEQ's trench model for estimating exposure point concentrations for construction workers in a trench.

µg/L = micrograms per liter

PCI/L = picocuries per liter

UCL = upper confidence limit

EPC = exposure point concentration

Table 3.21
Exposure Point Concentration Summary, Cradock Community Sediment
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

Chemical of Potential Concern	Units	Maximum Detected Concentration	Maximum Qualifier	Reasonable Maximum Exposure		
				Medium EPC Value	Medium EPC Statistic	Medium EPC Rationale
ALUMINUM (FUME OR DUST)	mg/kg	2.56E+04		2.03E+04	95% Student's-t UCL	Data are normally distributed
ARSENIC	mg/kg	1.87E+01	J	1.44E+01	95% Student's-t UCL	Data are normally distributed
COBALT	mg/kg	1.91E+02		8.83E+01	95% Adjusted Gamma UCL	Data are gamma distributed
IRON	mg/kg	4.02E+04		4.14E+04	95% Chebyshev (Mean, Sd) UCL	Data are nonparametric
LEAD	mg/kg	2.78E+02	J	1.17E+02	Average Concentration	Average detection used for blood lead modeling
MANGANESE	mg/kg	3.29E+02		2.54E+02	95% Student's-t UCL	Data are normally distributed
MERCURY	mg/kg	1.30E+00		7.44E-01	95% Student's-t UCL	Data are normally distributed
THALLIUM	mg/kg	2.20E+00	J	1.83E+00	95% KM (t) UCL	Data are normally distributed
VANADIUM (FUME OR DUST)	mg/kg	6.30E+01		5.23E+01	95% Student's-t UCL	Data are normally distributed
BISMUTH-212	pCi/g	1.42E+00	J	1.30E+00	95% Student's-t UCL	Data are nonparametric
BISMUTH-214	pCi/g	6.68E-01	J	6.16E-01	95% Student's-t UCL	Data are normally distributed
LEAD-212	pCi/g	1.24E+00	J	1.08E+00	95% Student's-t UCL	Data are normally distributed
LEAD-214	pCi/g	8.14E-01	J	7.21E-01	95% Student's-t UCL	Data are normally distributed
POTASSIUM-40	pCi/g	1.77E+01		1.66E+01	95% Student's-t UCL	Data are nonparametric
RADIUM-228	pCi/g	1.28E+00		1.21E+00	95% Student's-t UCL	Data are nonparametric
THALLIUM-208	pCi/g	3.86E-01	J	3.53E-01	95% Student's-t UCL	Data are nonparametric

J = Estimated Value
mg/kg = milligrams per kilogram
PCI/G = picocuries per gram
UCL = upper confidence limit
EPC = exposure point concentration

Table 4.1
Values Used for Daily Intake Calculations (Adult, Outdoor Maintenance Worker, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 2014	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	225	EPA, 2014	
	ED	Exposure Duration	years	25	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,527	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.12	EPA, 2014	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	225	EPA, 2014	
	ED	Exposure Duration	years	25	EPA, 2014	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989	

Table 4.1
Values Used for Daily Intake Calculations (Adult, Outdoor Maintenance Worker, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Radionuclides						
Ingestion	CS PRG-soil-ing	Chemical Concentration in Soil PRG for Soil Ingestion Exposure Route	pCi/g pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	Risk estimate = CS/PRG-soil-ing
External Exposure to Ionizing Radiation	CS PRG-soil-ext	Chemical Concentration in Soil PRG for External Exposure to Ionizing Radiation	pCi/g pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	Risk estimate = CS/PRG-soil-ext

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.2
Values Used for Daily Intake Calculations (Adult, Outdoor Maintenance Worker, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	8	EPA, 2014	CA xET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	225	EPA, 2014	
	ED	Exposure Duration	years	25	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	219,000	EPA, 2009	
Radionuclides						
Inhalation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.3
Values Used for Daily Intake Calculations (Adult, Construction Worker, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	330	EPA, 2002	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 2014	
	ED	Exposure Duration	years	1	EPA, 1991	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,527	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	EPA, 2002	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	250	EPA, 2014	
	ED	Exposure Duration	years	1	EPA, 1991	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989	

Table 4.3
Values Used for Daily Intake Calculations (Adult, Construction Worker, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Radionuclides						
Ingestion	CS PRG-soil-ing	Chemical Concentration in Soil PRG for Soil Ingestion Exposure Route	pCi/g pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	Risk estimate = CS/PRG-soil-ing
External Exposure to Ionizing Radiation	CS PRG-soil-ext	Chemical Concentration in Soil PRG for External Exposure to Ionizing Radiation	pCi/g pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	Risk estimate = CS/PRG-soil-ext

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.4
Values Used for Daily Intake Calculations (Adult, Construction Worker, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Air
Exposure Point: Site Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	8	EPA, 1991	CA xET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	250	EPA, 2014	
	ED	Exposure Duration	years	1	EPA, 1991	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	8,760	EPA, 2009	
Radionuclides						
Inhalation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.5
Values Used for Daily Intake Calculations (Child, Resident, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	200	EPA, 2014	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	6	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	2,373	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	EPA, 2014	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 2014	
	ED	Exposure Duration	years	6	EPA, 2014	
	BW	Body Weight	kg	15	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

Table 4.6
Values Used for Daily Intake Calculations (Child, Resident, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Ambient Air, Indoor Air
Exposure Point: Site Soil for Ambient Air; Vapor Intrusion for Indoor Air
Receptor Population: Resident
Receptor Age: Child

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	24	EPA, 2014	CA x ET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	6	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	52,560	EPA, 2009	

Sources:

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

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

Table 4.7
Values Used for Daily Intake Calculations (Adult, Resident, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 2014	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	20	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 2014	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,032	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.07	EPA, 2014	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	20	EPA, 2014	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 2014	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002. OSWER Directive 9285.6-03.

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

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

Table 4.8
Values Used for Daily Intake Calculations (Adult, Resident, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Ambient Air, Indoor Air
Exposure Point: Site Soil for Ambient Air; Vapor Intrusion for Indoor Air
Receptor Population: Resident
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	24	EPA, 2014	CA x ET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	20	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	175,200	EPA, 2014	

Sources:
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

Table 4.9
Values Used for Daily Intake Calculations (Age-Adjusted, Resident, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Lifetime, Age-Adjusted

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sc	Ingestion Rate of Soil, Child	mg/day	200	EPA, 2014	CS x IR-S-Adj x EF x CF x 1/AT
	IR-Sa	Ingestion Rate of Soil, Adult	mg/day	100	EPA, 2014	
	EF	Exposure Frequency	days/year	350	EPA, 1991	IR-S-Adj (mg-year/kg-day) =
	EDc	Exposure Duration, Child	years	6	EPA, 2014	(EDc x IR-Sc / BWc) + (EDa x IR-Sa / BWa)
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SAc	Skin Surface Area Available for Contact, Child	cm^2	2,373	EPA, 2014	CS x DA-Adj xDABS x CF x EF x 1/AT
	SAa	Skin Surface Area Available for Contact, Adult	cm^2	6,032	EPA, 2014	
	SSAFc	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.2	EPA, 2014	DA-Adj (mg-year/kg-day) =
	SSAFa	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.07	EPA, 2014	(EDc x SAc x SSAFc / BWc) +
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	(EDa x SAa x SSAFa / BWa)
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	EDc	Exposure Duration, Child	years	6	EPA, 2014	
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Radionuclides						
Ingestion	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.10
Values Used for Daily Intake Calculations (Age-Adjusted, Resident, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Lifetime, Age-adjusted

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) = CA x ET x EF x ED x 1/AT
	ET	Exposure time	hours/day	24	EPA, 2014	
	EF	Exposure Frequency	days/year	350	EPA, 1991	
	ED	Exposure Duration	years	26	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
Radionuclides						
Inhalation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.11
Values Used for Daily Intake Calculations (Child and Adolescent, Recreational User/Fisherman/Trespasser/Visitor, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child and Adolescent

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil (Adolescent)	mg/day	100	EPA, 2014	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	IR-S	Ingestion Rate of Soil (Child)	mg/day	200	EPA, 2014	
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration (Adolescent)	years	9	[2]	
	ED	Exposure Duration (Child)	years	6	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight (Adolescent)	kg	54.5	[3]	
	BW	Body Weight (Child)	kg	15	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact (Adolescent)	cm^2	10,200	[4]	CS x SA x SSAF x DABS x CF x EF x
	SA	Skin Surface Area Available for Contact (Child)	cm^2	2,373	EPA, 2014	ED x 1/BW x 1/AT
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.2	[5]	
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration (Adolescent)	years	9	[2]	
	ED	Exposure Duration (Child)	years	6	EPA, 2014	
	BW	Body Weight (Adolescent)	kg	54.5	[3]	
	BW	Body Weight (Child)	kg	15	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Radionuclides						
Ingestion	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:

[1] Approximately two days per week from April through October.

[2] Receptor assumed to be age 9 through 17 years of age.

[3] Weighted average body weight for children ages 9 through 17 years old, Table 8-1, EPA 2008.

[4] Average of head, hands, arms, legs, and feet, age 9 through 17 years. Table 7-2, EPA, 2008. Calculations provided in Table 5.12a.

[5] Value for child resident, EPA, 2014.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.11a
Skin Surface Area Calculations, Adolescent Recreational User/Fisherman/Trespasser/Visitor
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Age (years)	Mean Surface Area (m^2)					
	Head	Hands	Arms	Legs	Feet	Total
9	0.136	0.054	0.137	0.301	0.078	0.706
10	0.136	0.054	0.137	0.301	0.078	0.706
11	0.149	0.084	0.205	0.498	0.119	1.055
12	0.149	0.084	0.205	0.498	0.119	1.055
13	0.149	0.084	0.205	0.498	0.119	1.055
14	0.149	0.084	0.205	0.498	0.119	1.055
15	0.149	0.084	0.205	0.498	0.119	1.055
16	0.144	0.099	0.282	0.592	0.131	1.248
17	0.144	0.099	0.282	0.592	0.131	1.248

average of all years (m^2)	1.02
average of all years (cm^2)	10,200

Mean surface areas obtained from Table 7-2, Child-Specific Exposure Factors Handbook, EPA, 2008.

Table 4.12
Values Used for Daily Intake Calculations (Child and Adolescent, Recreational User/Fisherman/Trespasser/Visitor, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child and Adolescent

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) = CA xET x EF x ED x 1/AT
	ET	Exposure time	hours/day	4	[1]	
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration (Adolescent)	years	9	[3]	
	ED	Exposure Duration (Child)	years	6	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	78,840	EPA, 2009	
Radionuclides						
Inhalation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Assumed adolescent spends four hours per day on the site.
[2] Approximately two days per week from April through October
[3] Receptor assumed to be age 9 through 17 years.
Sources:

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.13
Values Used for Daily Intake Calculations (Recreational User/Fisherman/Trespasser/Visitor, Soil)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Site soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	100	EPA, 2014	CS x IR-S x EF x ED x CF x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration	years	20	[2]	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	6,032	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.07	EPA, 2014	ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration	years	20	[2]	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Ingestion	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Approximately two days per week from April through October.
[2] Exposure duration for adult resident. It is assumed that the recreational user/fisherman/trespasser lives near the site.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.14
Values Used for Daily Intake Calculations (Recreational User/Fisherman/Trespasser/Visitor, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Site soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	4	[1]	CA xET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	20	[3]	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	175,200	EPA, 2009	
Radionuclides						
Inhalation	CS	Chemical Concentration in Soil	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Assumed receptor spends four hours per day on the site.
[2] Approximately two days per week from April through October
[3] Exposure duration for adult resident. It is assumed that the recreational user/fisherman/trespasser lives near the site.
Sources:

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.15
Values Used for Daily Intake Calculations (Child, Recreational User/Fisherman, Fish Consumer, and Future Resident, Fish/Shellfish)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User/Fisherman and Fish Consumer
Future resident
Receptor Age: Child

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Fish	CF	Chemical Concentration in Fish	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Chemical Concentration in Shellfish	mg/kg			
	IR-F	Ingestion Rate of Fish	g/kg-day	3.58	[1]	
	IR-F	Ingestion Rate of Shellfish	g/kg-day	2.75	[2]	CF x IR-F x FF x CF x EF x ED x 1/AT
	FF	Fraction of Fish Consumed that is Caught On Site	unitless	0.25	[3]	
	CF	Conversion Factor	kg/g	0.001		
	EF	Exposure Frequency	days/year	350	[4]	
	ED	Exposure Duration	years	6	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Radionuclides						
Ingestion of Fish	CS	Chemical Concentration in Fish	pCi/g			Risk estimate = CS/PRG-fish-ing
	PRG-fish-ing	PRG for Fish Consumption Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] 95th percentile finfish ingestion rate, weighted average of years 0 - < 6 years, EPA 2011 (Table 10-8). Wet weight ingestion rate.
[2] 95th percentile shellfish ingestion rate, weighted average of years 0 - < 6 years, EPA 2011 (Table 10-8). Wet weight ingestion rate.
[3] It is assumed that the child consumes 25% of the fish and shellfish in his/her diet from the site.
[4] It is assumed that the child consumes fish and shellfish year-round.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.16
Values Used for Daily Intake Calculations (Adolescent, Recreational User/Fisherman, Fish/Shellfish)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/future Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Fish	CF	Chemical Concentration in Fish	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Chemical Concentration in Shellfish	mg/kg			
	IR-F	Ingestion Rate of Fish	g/kg-day	2.10	[1]	
	IR-F	Ingestion Rate of Shellfish	g/kg-day	1.93	[2]	CF x IR-F x FF x CF x EF x ED x 1/AT
	FF	Fraction of Fish Consumed that is Caught On Site	unitless	0.25	[3]	
	CF	Conversion Factor	kg/g	0.001		
	EF	Exposure Frequency	days/year	350	[4]	
	ED	Exposure Duration	years	9	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Radionuclides						
Ingestion of Fish	CS	Chemical Concentration in Fish	pCi/g			Risk estimate = CS/PRG-fish-ing
	PRG-fish-ing	PRG for Fish Consumption Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] 95th percentile finfish ingestion rate, weighted average of years 9 - 18 years, EPA 2011 (Table 10-8). Wet weight ingestion rate.
[2] 95th percentile shellfish ingestion rate, weighted average of years 9 - 18 years, EPA 2011 (Table 10-10). Wet weight ingestion rate.
[3] It is assumed that the adolescent consumes 25% of the fish and shellfish in his/her diet from the site.
[4] It is assumed that the adolescent consumes fish and shellfish year-round.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.17
Values Used for Daily Intake Calculations (Adult, Recreational User/Fisherman and Future Resident, Fish/Shellfish)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/future Recreational User/Fisherman
Future resident
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Fish	CF	Chemical Concentration in Fish	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	CS	Chemical Concentration in Shellfish	mg/kg			(CF x IR-F + CS x IR-S) x FF x CF x EF x ED x 1/AT
	IR-F	Ingestion Rate of Fish	g/kg-day	2.1	[1]	
	IR-S	Ingestion Rate of Fish	g/kg-day	2.2	[2]	
	FF	Fraction of Fish Consumed that is Caught on Site	unitless	0.25	[3]	
	CF	Conversion Factor	kg/g	0.001		
	EF	Exposure Frequency	days/year	350	[4]	
	ED	Exposure Duration	years	20	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Ingestion of Fish	CS	Chemical Concentration in Fish	pCi/g			Risk estimate = CS/PRG-fish-ing
	PRG-fish-ing	PRG for Fish Consumption Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] 95th percentile finfish ingestion rate, ages 21 - < 50 years, EPA 2011 (Table 10-1, consumers only, finfish). Wet weight ingestion rat
[2] 95th percentile shellfish ingestion rate, ages 21 - < 50 years, EPA 2011 (Table 10-1, consumers only, shellfish). Wet weight ingestion rat
[3] It is assumed that the recreational fishermen catches 25% of the fish and shellfish in his/her diet from the sit
[4] It is assumed that the adult consumes fish and shellfish year-round
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002
EPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-12(
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.18
Values Used for Daily Intake Calculations (Child, Subsistence Fisherman, Fish/Shellfish)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Future Subsistence Fisherman
Receptor Age: Child

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Fish	CF	Chemical Concentration in Fish	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	CF	Chemical Concentration in Shellfish	mg/kg			
	IR-F	Ingestion Rate of Fish	g/kg-day	2.1	[1]	
	IR-F	Ingestion Rate of Shellfish	g/kg-day	2.5	[2]	CF x IR-F x FF x CF x EF x ED x 1/AT
	CF	Conversion Factor	kg/g	0.001		
	EF	Exposure Frequency	days/year	350	[3]	
	ED	Exposure Duration	years	6	EPA, 1991	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Radionuclides						
Ingestion of Fish	CS	Chemical Concentration in Fish	pCi/g			Risk estimate = CS/PRG-fish-ing
	PRG-fish-ing	PRG for Fish Consumption Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] 90th percentile finfish ingestion rate, all finfish, child consumers, EPA 2011 (Table 10-108).
[2] 90th percentile shellfish ingestion rate, all shellfish, child consumers, EPA 2011 (Table 10-108).
[3] It is assumed that the child consumes fish and shellfish year-round.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.19
Values Used for Daily Intake Calculations (Adult, Subsistence Fisherman, Fish/Shellfish)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Future Subsistence Fisherman
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Fish	CF	Chemical Concentration in Fish	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	CS	Chemical Concentration in Shellfish	mg/kg			(CF x IR-F + CS x IR-S) x FF x CF x EF x ED x 1/AT
	IR-F	Ingestion Rate of Fish	g/kg-day	2.5	[1]	
	IR-S	Ingestion Rate of Fish	g/kg-day	4.6	[2]	
	FF	Fraction of Fish Consumed that is Caught on Site	unitless	0.25	[3]	
	CF	Conversion Factor	kg/g	0.001		
	EF	Exposure Frequency	days/year	350	[4]	
	ED	Exposure Duration	years	20	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Ingestion of Fish	CS	Chemical Concentration in Fish	pCi/g			Risk estimate = CS/PRG-fish-ing
	PRG-fish-ing	PRG for Fish Consumption Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] 90th percentile finfish ingestion rate, all finfish, adult consumers, EPA 2011 (Table 10-104).
[2] 90th percentile shellfish ingestion rate, all shellfish, adult consumers, EPA 2011 (Table 10-104).
[3] It is assumed that the recreational fishermen catches 25% of the fish and shellfish in his/her diet from the site.
[4] It is assumed that the adult consumes fish and shellfish year-round.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.20
Values Used for Daily Intake Calculations (Child, Resident, Groundwater)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.78	EPA, 2014	Cw x IR x EF x ED / (BW x AT-N)
	EF	Exposure Frequency	days/year	350	EPA, 2014	
	ED	Exposure Duration	years	6	EPA, 2014	
	BW	Body Weight	kg	15	EPA, 2014	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L	Cwd calculated by Foster-Chrostowski model		CDI = Devent x SA x ED x EF/(BW x AT-N)
	CF	Conversion Factor	L/cm^3	0.001		
	SA	Skin Surface Area Available for Contact	cm^2/event	6,365	EPA, 2014	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	tevent	Exposure time	hours/event	0.54	EPA, 2014	
	EF	Exposure Frequency	events/year	350	EPA, 2014	
	ED	Exposure Duration	years	6	EPA, 2014	For organics:
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	If tevent < or = t*, then
	Kp	Permeability Coefficient	cm/hr	chem specific for metals calculated for organics	EPA, 2004	Devent = 2 x FA x Kp x Cw x CF x $(6 \times tau_{event} \times tevent \times 1/pi)^{1/2}$
	tau_{event}	Lag time per event	hr/event	calculated	EPA, 2004	If tevent > t*, then
	B	Dimensionless constant	unitless	calculated	EPA, 2004	Devent = FA x Kp x CF x Cw x $\{tevent/(1+B) + 2 \times tau_{event} \times [1+3B+3B^2/(1+B)^2]\}$
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	
	BW	Body Weight	kg	15	EPA, 2014	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	

Notes:

cm^2 /event = square centimeter per event
cm/hr = centimeter per hour
hrs = hours
hr/event = hour per event
kg = kilogram
L/cm^3 = liters per cubic centimeter
L/day = liters per day
L/m^3 = liters per cubic meter
mg/L = milligrams per liter
mg/cm^2 -event = milligram per square centimeter per event

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.21
Values Used for Daily Intake Calculations (Adult, Resident, Groundwater)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	2.5	EPA, 2014	Cw x IR x EF x ED / (BW x AT-N)
	EF	Exposure Frequency	days/year	350	EPA, 2014	
	ED	Exposure Duration	years	20	EPA, 2014	
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-cancer)	days	7,300	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L	Cwd calculated by Foster-Chrostowski model		CDI = Devent x SA x ED x EF/(BW x AT-N)
	CF	Conversion Factor (CF)	L/cm^3	0.001		
	SA	Skin Surface Area	cm^2/event	19,652	EPA, 2014	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	tevent	Exposure time	hours/event	0.71	EPA, 2014	
	EF	Exposure Frequency	events/year	350	EPA, 2014	
	ED	Exposure Duration	years	20	EPA, 2014	For organics:
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	If tevent < or = t*, then
	Kp	Permeability Coefficient	cm/hr	chem specific for metals calculated for organics	EPA, 2004	Devent = 2 x FA x Kp x Cw x CF x $(6 \times tau_{event} \times tevent \times 1/pi)^{1/2}$
	tau_{event}	Lag time per event	hr/event	calculated	EPA, 2004	If tevent > t*, then
	B	Dimensionless constant	unitless	calculated	EPA, 2004	Devent = FA x Kp x CF x Cw x {tevent/(1+B) + 2 x tau_{event} x
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	$[1+3B+3B^2/(1+B)^2]$}
	BW	Body Weight	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-cancer)	days	7,300	EPA, 1989	

Notes:

cm^2 /event = square centimeter per event
cm/hr = centimeter per hour
hrs = hours
hr/event = hour per event
kg = kilogram
L/cm^3 = liters per cubic centimeter
L/day = liters per day
L-year/kg-day = liters per year per kilograms per day
mg/L = milligrams per liter
mg/cm^2 -event = milligram per square centimeter per event

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

Table 4.22
Values Used for Daily Intake Calculations (Age-Adjusted, Resident, Groundwater)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Lifetime, Age-Adjusted

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IRc	Ingestion Rate, Child	L/day	0.78	EPA, 2014	Cw x IR-Adj x EF x 1/AT-C
	IRa	Ingestion Rate, Adult	L/day	2.5	EPA, 2014	
	EF	Exposure Frequency	days/year	350	EPA, 2014	IR-Adj (liter-year/kg-day) =
	EDc	Exposure Duration, Child	years	6	EPA, 2014	(EDc x IRc/BWc) + (EDa x IRa/BWa)
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L	Cwd calculated by Foster-Chrostowski model		CDI = Devent-Adj x EF x 1/AT-C
	CF	Conversion Factor	L/cm^3	0.001		
	SAc	Skin Surface Area Available for Contact, Child	cm^2/event	6,365	EPA, 2014	Devent-Adj (mg/cm^2-event)=
	SAa	Skin Surface Area Available for Contact, Adult	cm^2/event	19,652	EPA, 2014	(Devent-A x SAa x EDa x 1/BWa) + (Devent-C x SAc x EDc x 1/BWc)
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	
	tevent	Exposure time, Child	hours/event	0.54	EPA, 2014	For inorganics:
	tevent	Exposure time, Adult	hours/event	0.71	EPA, 2014	Devent = Cw x CF x Kp x tevent
	EF	Exposure Frequency	events/year	350	EPA, 2014	
	EDc	Exposure Duration, Child	years	6	EPA, 2014	For organics:
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	If tevent < or = t*, then
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	Devent = 2 x FA x Kp x Cw x CF x $(6 \times tau_{event} \times tevent \times 1/pi)^{1/2}$
	Kp	Permeability Coefficient	cm/hr	chem specific for metals calculated for organics	EPA, 2004	
	tau_{event}	Lag time per event	hr/event	calculated	EPA, 2004	If tevent > t*, then
	B	Dimensionless constant	unitless	calculated	EPA, 2004	Devent = FA x Kp x CF x Cw x $\{tevent/(1+B) + 2 \times tau_{event} \times [1+3B+3B^2/(1+B)^2]\}$
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Radionuclides						
Ingestion	CW	Chemical Concentration in Groundwater	pCi/L			Risk estimate = CW/PRG-water-ing
	PRG-water-ing	PRG for Tapwater Ingestion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Immersion	CW	Chemical Concentration in Groundwater	pCi/L			Risk estimate = CW/PRG-water-imm
	PRG-water-imm	PRG for Immersion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:

cm^2 /event = square centimeter per event
cm/hr = centimeter per hour
hrs = hours
hr/event = hour per event
kg = kilogram
L/cm^3 = liters per cubic centimeter
L/day = liters per day
L/m^3 = liters per cubic meter
mg/L = milligrams per liter
mg/cm^2 -event = milligram per square centimeter per event

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.23
Values Used for Daily Intake Calculations (Adult, Resident, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation While Showering	Cw	Chemical Concentration in Water	mg/L			Foster and Chrostowski Model Exposure Concentration (EC) (mg/m^3) = CA x ED x EF x 1/AT
	CA	Chemical Concentration in Air	mg/m^3	Model Output	Foster and Chrostowski, 1986	
	ET	Exposure time (time in shower)	minutes	43	EPA, 2014	
	ETsr	Total time in shower room	minutes	60	EPA, 2015	
	Tl	Calibration temperature of water	K	293	Foster and Chrostowski, 1986	
	Ts	Shower water temperature	K	318	Foster and Chrostowski, 1986	
	Us	Water viscosity at Ts	cp	0.596	Foster and Chrostowski, 1986	
	Ul	Water viscosity at Tl	cp	1.002	Foster and Chrostowski, 1986	
	d	Shower droplet diameter	mm	1	Foster and Chrostowski, 1986	
	sdt	Shower droplet drop time	sec	0.5	EPA, 2015	
	FR	Shower water flow rate	L/min	10	Foster and Chrostowski, 1986	
	SV	Shower room air volume	m^3	12	EPA, 2015	
	R	Air exchange rate	min^{-1}	0.01667	EPA, 2015	
	EF	Exposure Frequency	days/year	350	EPA, 2014	
	ED	Exposure Duration	years	20	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Inhalation	CW	Chemical Concentration in Groundwater	pCi/L			Risk estimate = CW/PRG-water-inh
	PRG-water-inh	PRG for Inhalation (Groundwater) Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final.
Foster and Chrostowski, 1986. Foster S.A., and Chrostowski P.C. 1986. Integrated Household Exposure Model for use of Tap Water Contaminated with Volatile Organic Chemicals, Proc. 79th Ann. Meeting of Air Pollution Control Association, Minneapolis
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA, 2015: Comments provided to HGL included in Review of Jackson Ceramix Interim Risk Tables 1 - 6, September 24, 2015.

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.24
Values Used for Daily Intake Calculations (Child, Recreational User/Trespasser and Resident, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland, Northern Drainage Channel, Paradise Creek, Estuarine Wetland
Receptor Population: Recreational User/Trespasser and Resident
Receptor Age: Child

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Sediment	mg/day	200	EPA, 2014	CS x IR-S x EF x ED x CF x F x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration	years	6	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	15	EPA, 2014	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[2]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Sediment	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	2,373	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	[3]	F x ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration	years	6	EPA, 2014	
	BW	Body Weight	kg	15	EPA, 2014	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[2]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Radionuclides						
Ingestion	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG	EPA PRG Calculator [4]	
External Exposure to	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG	EPA PRG Calculator [4]	

Notes:
[1] Two days per week from April through October.
[2] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the receptors are exposed to each type of applicable sediment during each site visit. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.
[3] Geometric mean adherence factor for reed gatherers (EPA, 2004).
[4] The EPA PRG Calculator does not calculate PRGs for a sediment exposure pathway. The soil exposure PRGs, calculated with sediment exposure parameters, will be used as a surrogate.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

Table 4.25
Values Used for Daily Intake Calculations (Adolescent, Recreational User/Fisherman/Trespasser/Visitor, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland, Northern Drainage Channel, Paradise Creek, Estuarine Wetland
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Sediment	mg/day	100	[1]	CS x IR-S x EF x ED x CF x F x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	9	[3]	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	54.5	[4]	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor) 0.5 (Recreational User/Fisherman)	[5]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Sediment	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	10,200	[6]	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	[7]	F x ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	30	[2]	
	ED	Exposure Duration	years	9	[3]	
	BW	Body Weight	kg	54.5	[4]	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor) 0.5 (Recreational User/Fisherman)	[5]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Radionuclides						
Ingestion[8]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation[8]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Same ingestion rate as for soil.
[2] Two days per week from April through October.
[3] Receptor assumed to be age 9 through 17 years.
[4] Weighted average body weight for children ages 9 through 17 years, Table 8-1, EPA 2008.
[5] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the receptors are exposed to each type of applicable sediment during each site visit. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.
[6] Average of head, hands, arms, legs, and feet, age 9 through 17 years. Table 7-2, EPA, 2008.
[7] Geometric mean adherence factor for reed gatherers (EPA, 2004).
[8] The EPA PRG Calculator does not calculate PRGs for a sediment exposure pathway. The soil exposure PRGs, calculated with sediment exposure parameters, will be used as a surrogate.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.26
Values Used for Daily Intake Calculations (Adult, Recreational User/Fisherman/Trespasser/Visitor, Future Resident, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland, Northern Drainage Channel, Paradise Creek, Estuarine Wetland
Receptor Population: Current/Future Recreational User/Fisherman/Trespasser/Visitor
Future resident
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) = CS x IR-S x EF x ED x CF x F x 1/BW x 1/AT
	IR-S	Ingestion Rate of Sediment	mg/day	100	[1]	
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	20	[3]	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[4]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Sediment	mg/kg			CDI (mg/kg-day) = CS x SA x SSAF x DABS x CF x EF x F x ED x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	6,032	EPA, 2014	
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	[5]	
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	60	[1]	
	ED	Exposure Duration	years	20	[2]	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[4]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Ingestion[6]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation[6]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Same ingestion rate as for soil.
[2] Two days per week from April through October.
[3] Exposure duration for adult resident. It is assumed that the recreational user/fisherman/trespasser lives near the site.
[4] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the receptors are exposed to each type of applicable sediment during each site visit. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.
[5] Geometric mean adherence factor for reed gatherers (EPA, 2004).
[6] The EPA PRG Calculator does not calculate PRGs for a sediment exposure pathway. The soil exposure PRGs, calculated with sediment exposure parameters, will be used as a surrogate.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.27
Values Used for Daily Intake Calculations (Age-Adjusted, Resident, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland, Northern Drainage Channel, Paradise Creek, Estuarine Wetland
Receptor Population: Resident
Receptor Age: Lifetime, Age-Adjusted

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Sediment	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-Sc	Ingestion Rate of sediment, Child	mg/day	200	EPA, 2014	CS x IR-S-Adj x EF x CF x F x 1/AT
	IR-Sa	Ingestion Rate of sediment, Adult	mg/day	100	EPA, 2014	
	EF	Exposure Frequency	days/year	60	[1]	IR-S-Adj (mg-year/kg-day) =
	EDc	Exposure Duration, Child	years	6	EPA, 2014	(EDc x IR-Sc / BWc) + (EDa x IR-Sa / BWa)
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[2]	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Sediment	mg/kg			CDI (mg/kg-day) =
	SAc	Skin Surface Area Available for Contact, Child	cm^2	2,373	EPA, 2014	CS x DA-Adj xDABS x CF x F x EF x 1/AT
	SAa	Skin Surface Area Available for Contact, Adult	cm^2	6,032	EPA, 2014	
	SSAFc	Soil to Skin Adherence Factor, Child	mg/cm^2-day	0.3	[3]	DA-Adj (mg-year/kg-day) =
	SSAFa	Soil to Skin Adherence Factor, Adult	mg/cm^2-day	0.3	[3]	(EDc x SAc x SSAFc / BWc) +
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	(EDa x SAa x SSAFa / BWa)
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	60	[1]	
	EDc	Exposure Duration, Child	years	6	EPA, 2014	
	EDa	Exposure Duration, Adult	years	20	EPA, 2014	
	F	fraction exposed	unitless	0.25 (Trespasser/Visitor/Resident) 0.5 (Recreational User/Fisherman)	[2]	
	BWc	Body Weight, Child	kg	15	EPA, 2014	
	BWa	Body Weight, Adult	kg	80	EPA, 2014	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
Radionuclides						
Ingestion[4]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil Ingestion Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
External Exposure to Ionizing Radiation[4]	CS	Chemical Concentration in Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:

[1] Two days per week from April through October.

[2] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the receptors are exposed to each type of applicable sediment during each site visit. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.

[3] Geometric mean adherence factor for reed gatherers (EPA, 2004).

[4] The EPA PRG Calculator does not calculate PRGs for a sediment exposure pathway. The soil exposure PRGs, calculated with sediment exposure parameters, will be used as a surrogate.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.28
Values Used for Daily Intake Calculations (Adult, Utility Worker, Soil, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil and Sediment
Exposure Medium: Soil, Sediment, and Air
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion of Soil or Sediment	CS	Chemical Concentration in Soil/Sediment	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) = CS x IR-S x EF x CF x F x 1/BW x 1/AT
	IR-S	Ingestion Rate of Soil	mg/day	330	EPA, 2002	
	EF	Exposure Frequency	days	20	[1]	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.25 (sediment) 1 (soil)	[3]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	28	[2]	
Dermal Absorption of Soil or Sediment	CS	Chemical Concentration in Soil/Sediment	mg/kg	b		CDI (mg/kg-day) = CS x SA x SSAF x DABS x CF x F x EF x 1/BW x 1/AT
	SA	Skin Surface Area Available for Contact	cm^2	3,527	EPA, 2014	
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	EPA, 2002	
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days	20	[1]	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.25 (sediment) 1 (soil)	[3]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	28	[2]	
Inhalation of Volatile and Fugitive Dust Emissions, and Volatiles from Vapor Intrusion	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) = CA x ET x EF x F x 1/AT
	ET	Exposure time	hours/day	8	[1]	
	EF	Exposure Frequency	days	20	[2]	
	F	fraction exposed	unitless	0.25 (sediment) 1 (soil)	[3]	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	672	EPA, 2009	

Table 4.28
Values Used for Daily Intake Calculations (Adult, Utility Worker, Soil, Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil and Sediment
Exposure Medium: Soil, Sediment, and Air
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Radionuclides						
Ingestion of Soil or Sediment	CS PRG-soil-ing	Chemical Concentration in Soil/Sediment PRG for Soil/Sediment Ingestion Exposure Route	pCi/g pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	Risk estimate = CS/PRG-soil-ing
External Exposure to Ionizing Radiation	CS	Chemical Concentration in Soil/Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Inhalation of Soil or Sediment	CS	Chemical Concentration in Soil or Sediment	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Time to install 2,000 linear foot of trench estimated from the production rates provided in RSMeans.
[2] Exposure duration associated with a single, 20 working day (4 weeks) project.
[3] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the receptors are exposed to each type of applicable sediment during each site visit. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.

Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.
EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated by EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used in the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used in the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.29
Values Used for Daily Intake Calculations (Adult, Construction Worker (Dock Project), Sediment)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland and Paradise Creek
Receptor Population: Construction Worker (Dock Project)
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR-S	Ingestion Rate of Soil	mg/day	330	EPA, 2002	CS x IR-S x EF x ED x CF x F x 1/BW x 1/AT
	EF	Exposure Frequency	days/year	90	[1]	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	BW	Body Weight	kg	80	EPA, 2014	
	F	Fraction Exposed	unitless	0.5		
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	126	EPA, 1989	
Dermal Absorption	CS	Chemical Concentration in Soil	mg/kg			CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	3,527	EPA, 2014	CS x SA x SSAF x DABS x CF x EF x
	SSAF	Soil to Skin Adherence Factor	mg/cm^2-day	0.3	EPA, 2002	F x ED x 1/BW x 1/AT
	DABS	Dermal Absorption Factor Solids	--	chem. specific	EPA, 2004	
	CF	Conversion Factor	kg/mg	0.000001	- -	
	EF	Exposure Frequency	days/year	90	[1]	
	BW	Body Weight	kg	80	EPA, 2014	
	F	Fraction Exposed	unitless	0.5		
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	126	EPA, 1989	
Inhalation of Volatile and Fugitive Dust Emissions, and Volatiles from Vapor Intrusion	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	8	[2]	CA x ET x EF x F x 1/AT
	EF	Exposure Frequency	days	90	[1]	
	F	Fraction Exposed	unitless	0.5		
	AT-C	Averaging Time (Cancer)	hours	613200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	2160	EPA, 2009	
Radionuclides						
Ingestion of Soil or Sediment	CS	Chemical Concentration in Soil/Sediment	pCi/g			Risk estimate = CS/PRG-soil-ing
	PRG-soil-ing	PRG for Soil/Sediment Ingestion	pCi/g	Calculated Using	EPA PRG	
External Exposure to Ionizing Radiation	CS	Chemical Concentration in Soil/Sediment	pCi/g			Risk estimate = CS/PRG-soil-ext
	PRG-soil-ext	PRG for External Exposure to Ionizing Radiation	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Inhalation of Soil or Sediment	CS	Chemical Concentration in Soil or Sedime	pCi/g			Risk estimate = CS/PRG-soil-inh
	PRG-soil-inh	PRG for Inhalation (Soil) Exposure Route	pCi/g	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Sources:

[1] Assumed reasonable exposure duration for a standard dock construction project.

[2] The ET for the construction worker (default project) was used.

[3] Four types of sediment are at the site: Northern Drainage Channel, freshwater, estuarine, and Paradise Creek. It is assumed that the dock construction project would be restricted to Paradise Creek sediment and estuarine wetland sediment. Risk will be quantified separately for each type of applicable sediment using the faction exposed and the risks for each type of sediment will be summed as part of the cumulative risk calculations.

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.

EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.

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

EPA, 2004. Risk Assessment Guidance for Superfund, Vol. 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. OSWER 9285.7-02EP.

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

EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search

Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.30
Values Used for Daily Intake Calculations (Adolescent, Recreational User/Fisherman/Trespasser/Visitor, Surface Water)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel, Paradise Creek, Estuarine
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.1	[1]	Cw x IR x EF x ED x F / (BW x AT)
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	9	[3]	
	BW	Body Weight	kg	54.5	[4]	
	F	fraction exposed	unitless	0.33 for trespasser/visitor 0.5 for recreational user/fisherman	[5]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L			CDI = Devent x SA x ED x EF x F/(BW x AT)
	CF	Conversion Factor	L/cm^3	0.001		
	SA	Skin Surface Area Available for Contact	cm^2/event	10,200	[6]	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	t_{event}	Exposure time	hours/event	2	[7]	
	EF	Exposure Frequency	events/year	60	[2]	
	ED	Exposure Duration	years	9	[3]	For organics:
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	If t_{event} < or = t*, then
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 2004	Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$
	t_{event}	Lag time per event	hr/event	calculated	EPA, 2004	
	B	Dimensionless constant	unitless	calculated	EPA, 2004	If t_{event} > t*, then
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	Devent =
	BW	Body Weight	kg	54.5	[4]	$(FA)(Kp)(CF)(Cw)[t_{event}/(1+B)+2t_{event}((1+3B+B^2/(1+B)^2)]$
	F	fraction exposed	unitless	0.33 for trespasser/visitor 0.5 for recreational user/fisherman	[5]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	3,285	EPA, 1989	
Radionuclides						
Ingestion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-ing
	PRG-water-ing	PRG for Surface Water Ingestion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Immersion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-imm
	PRG-water-imm	PRG for Immersion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Nominal ingestion rate to account for incidental exposure.
[2] Two days per week from April through October.
[3] Receptor assumed to be age 9 through 17 years.
[4] Weighted average body weight for children ages 9 through 17 years, Table 8-1, EPA 2008.
[5] Three types of surface water are at the site: Northern Drainage Channel, estuarine, and Paradise Creek. It is assumed that this receptor is exposed to each type of applicable surface water during each site visit. Risk will be quantified separately for each type of applicable surface water using the faction exposed and the risks for each type of surface water will be summed as part of the cumulative risk calculations.
[6] Average of head, hands, arms, legs, and feet, age 9 through 17 years. Table 7-2, EPA, 2008.
[7] Receptor assumed to spend 2 hours per day at the site.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.31
Values Used for Daily Intake Calculations (Adult, Recreational User/Fisherman/Trespasser/Visitor, Future Resident, Surface Water)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel, Paradise Creek, Estuarine
Receptor Population: Current/Future Recreational User/Fisherman/Trespasser/Visitor
Future resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.1	[1]	Cw x IR x EF x ED x F / (BW x AT)
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	20	[3]	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.33 for trespasser/visitor/resident 0.5 for recreational user/fisherman	[4]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L			CDI = Devent x SA x ED x EF x F/(BW x AT)
	CF	Conversion Factor	L/cm^3	0.001		
	SA	Skin Surface Area Available for Contact	cm^2/event	6,032	EPA, 2014	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	t_{event}	Exposure time	hours/event	2	[5]	
	EF	Exposure Frequency	events/year	60	[2]	
	ED	Exposure Duration	years	20	[3]	For organics:
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	If t_{event} < or = t*, then
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 2004	Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$
	t_{event}	Lag time per event	hr/event	calculated	EPA, 2004	
	B	Dimensionless constant	unitless	calculated	EPA, 2004	If t_{event} > t*, then
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	Devent = $(FA)(Kp)(CF)(Cw)[t_{event}/(1+B)+2t_{event}((1+3B+B^2/(1+B)^2)]$
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.33 for trespasser/visitor/resident 0.5 for recreational user/fisherman	[4]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	7,300	EPA, 1989	
Radionuclides						
Ingestion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-ing
	PRG-water-ing	PRG for Surface Water Ingestion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Immersion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-imm
	PRG-water-imm	PRG for Immersion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Nominal ingestion rate to account for incidental exposure.
[2] Two days per week from April through October.
[3] Exposure duration for adult resident.
[4] Three types of surface water are at the site: Northern Drainage Channel, estuarine, and Paradise Creek. It is assumed that this receptor is exposed to each type of applicable surface water during each site visit. Risk will be quantified separately for each type of applicable surface water using the faction exposed and the risks for each type of surface water will be summed as part of the cumulative risk calculations.
[5] Receptor assumed to spend 2 hours per day at the site.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.32
Values Used for Daily Intake Calculations (Child, Recreational User/Trespasser and Resident, Surface Water)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel, Paradise Creek, Estuarine
Receptor Population: Recreational User/Trespasser and Resident
Receptor Age: Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.1	[1]	Cw x IR x EF x ED x F / (BW x AT)
	EF	Exposure Frequency	days/year	60	[2]	
	ED	Exposure Duration	years	6	EPA, 2014	
	BW	Body Weight	kg	15	EPA, 2014	
	F	fraction exposed	unitless	0.33 for trespasser/visitor/resident 0.5 for recreational user/fisherman	[3]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L			CDI = Devent x SA x ED x EF x F/(BW x AT)
	CF	Conversion Factor	L/cm^3	0.001		
	SA	Skin Surface Area Available for Contact	cm^2/event	2,373	EPA, 2014	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	t_{event}	Exposure time	hours/event	2	[4]	
	EF	Exposure Frequency	events/year	60	[2]	
	ED	Exposure Duration	years	6	EPA, 2014	For organics:
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	If t_{event} < or = t*, then
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 2004	Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$
	t_{event}	Lag time per event	hr/event	calculated	EPA, 2004	
	B	Dimensionless constant	unitless	calculated	EPA, 2004	If t_{event} > t*, then
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	Devent = $(FA)(Kp)(CF)(Cw)[t_{event}/(1+B)+2t_{event}((1+3B+B^2/(1+B)^2)]$
	BW	Body Weight	kg	15	EPA, 2014	
	F	fraction exposed	unitless	0.33 for trespasser/visitor/resident 0.5 for recreational user/fisherman	[3]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989	
Radionuclides						
Ingestion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-ing
	PRG-water-ing	PRG for Surface Water Ingestion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Immersion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-imm
	PRG-water-imm	PRG for Immersion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Nominal ingestion rate to account for incidental exposure.
[2] Two days per week from April through October.
[3] Three types of surface water are at the site: Northern Drainage Channel, estuarine, and Paradise Creek. It is assumed that this receptor is exposed to each type of applicable surface water during each site visit. Risk will be quantified separately for each type of applicable surface water using the faction exposed and the risks for each type of surface water will be summed as part of the cumulative risk calculations.
[4] Receptor assumed to spend 2 hours per day at the site.
Sources:
EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2008. Child-Specific Exposure Factors Handbook (Final Report).
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.33
Values Used for Daily Intake Calculations (Adult, Utility Worker, Surface Water)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Site Surface Water
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L			Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.02	[1]	Cw x IR x F x EF / (BW x AT)
	EF	Exposure Frequency	days	20	[2]	
	BW	Body Weight	kg	80	EPA, 2014	
	F	fraction exposed	unitless	0.33	[5]	
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	28	[3]	
Dermal Absorption	Cw	Chemical Concentration in Water	mg/L			CDI = Devent x SA x F x EF/(BW x AT)
	CF	Conversion Factor	L/cm^3	0.001		
	SA	Skin Surface Area Available for Contact	cm^2/event	3,527	EPA, 2014	For inorganics:
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	EPA, 2004	Devent = Cw x CF x Kp x tevent
	t_{event}	Exposure time	hours/event	4	[4]	
	EF	Exposure Frequency	events	20	[2]	
	FA	Fraction absorbed	unitless	chem specific	EPA, 2004	For organics:
	Kp	Permeability Coefficient	cm/hr	chem specific	EPA, 2004	If t_{event} < or = t*, then
	t_{event}	Lag time per event	hr/event	calculated	EPA, 2004	Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$
	B	Dimensionless constant	unitless	calculated	EPA, 2004	
	t*	Time to reach steady-state	hrs	calculated	EPA, 2004	If t_{event} > t*, then
	BW	Body Weight	kg	80	EPA, 2014	Devent =
	F	fraction exposed	unitless	0.33	[5]	$(FA)(Kp)(CF)(Cw)[t_{event}/(1+B)+2t_{event}((1+3B+B^2/(1+B)^2)]$
	AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989	
	AT-N	Averaging Time (Non-Cancer)	days	28	EPA, 1989	
Radionuclides						
Ingestion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-ing
	PRG-water-ing	PRG for Surface Water Ingestion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	
Immersion	CW	Chemical Concentration in Surface Water	pCi/L			Risk estimate = CW/PRG-water-imm
	PRG-water-imm	PRG for Immersion Exposure Route	pCi/L	Calculated Using EPA PRG Calculator	EPA PRG Calculator	

Notes:
[1] Groundwater ingestion rate for construction worker as listed in VURAM, Appendix 4.
[2] Estimated time to install 2,000 linear feet of trench; for dermal absorption, assume one event per day.
[3] Exposure duration associated with a single, 20 working day (4 weeks) project.
[4] Groundwater exposure time for construction worker listed in VURAM, Appendix 4.
[5] Three types of surface water are at the site: Northern Drainage Channel, estuarine, and Paradise Creek. It is assumed that this receptor is exposed to each type of applicable surface water during each site visit. Risk will be quantified separately for each type of applicable surface water using the faction exposed and the risks for each type of surface water will be summed as part of the cumulative risk calculations.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 2004: Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final, EPA/540/R/99/005, July 2004.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.
EPA PRG Calculator: value calculated automatically within EPA PRG calculator, available at https://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search
Equations used within the EPA PRG Calculator are available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Guidance on using the PRG calculator to estimate risk is found in Section 2.7.1 of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html
Exposure parameters used within the EPA PRG Calculator are presented in Table 1 (Section 5) of the PRG User's Guide, available at https://epa-prgs.ornl.gov/radionuclides/prg_guide.html

Table 4.34
Values Used for Daily Intake Calculations (Adult, Construction Worker (Default Project), Construction Worker (Dock Project), Utility Worker, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air Inside an Excavation
Receptor Population: Construction Worker (Default Project), Construction Worker (Dock Project), Utility Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	4	[1]	CA x ET x EF x 1/AT
	EF	Exposure Frequency (Default Project)	days	62	[2]	
	EF	Exposure Frequency (Dock Project)	days	20	[3]	
	EF	Exposure Frequency (Utility Worker Project)	days	90	[4]	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N[5]	Averaging Time - Default Project (Non-Cancer)	hours	2,083	EPA, 2009	
	AT-N[5]	Averaging Time - Dock Project (Non-Cancer)	hours	672	EPA, 2009	
	AT-N[5]	Averaging Time - Utility Worker Project (Non-Cancer)	hours	3,024	EPA, 2009	
Radionuclides						
Combined (Inhalation and Dermal)	CS	Chemical Concentration in Air	pCi/m3			Risk estimate = CS/PRG-air
	PRG-soil-inh	PRG for Air Exposure Route	pCi/m3	Calculated Using EPA	EPA PRG Calculator	

Notes:
[1] It is assumed that a construction worker spends half the work day in an excavation. This assumption matches the groundwater exposure time for a construction worker listed in VURAM Appendix 4.
[2] It is assumed that the excavation is continuously open for one-fourth of the exposure duration, then is filled in by the foundation and backfill.
[3] Estimated time to install 2,000 linear feet of trench.
[4] Assumed reasonable exposure duration for a standard dock construction project.
[5] Averaging time for non-cancer exposure is the applicable exposure frequency (days), converted to hours.

Sources:
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.

Table 4.35
Values Used for Daily Intake Calculations (Adult, Indoor Worker, Air)
Peck Iron and Metal Superfund Site
Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Soil gas
Exposure Medium: Air
Exposure Point: Air Inside a Future Building
Receptor Population: Indoor Worker
Receptor Age: Adult

Exposure Routes	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Inhalation	CA	Chemical Concentration in Air	mg/m^3			Adjusted air concentration (mg/m^3) =
	ET	Exposure time	hours/day	8	[1]	CA x ET x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	250	[2]	
	ED	Exposure Duration	years	25	EPA, 2014	
	AT-C	Averaging Time (Cancer)	hours	613,200	EPA, 2009	
	AT-N	Averaging Time (Non-Cancer)	hours	219,000	EPA, 2009	

Notes:

[1] Standard work day.

[2] Standard work year.

Sources:

EPA, 2009. Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment), Final. OSWER 9285.7-82, January 2009.
EPA, 2014: Update of Standard Default Exposure Factors, Human Health Evaluation Manual, Supplemental Guidance. OSWER Directive 9200.1-120.

Table 5.1
Non-Cancer Toxicity Data -- Oral/Dermal
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (Mo-Yr) [3]
1,2,4-Trichlorobenzene	Chronic	1.0E-02	mg/kg-day	1	1.0E-02	mg/kg-day	Adrenal glands	1000/1	IRIS	Nov-17
Chlorobenzene	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Liver	1000/1	IRIS	Nov-17
cis-1,2-Dichloroethene	Chronic	2.0E-03	mg/kg-day	1	2.0E-03	mg/kg-day	Kidneys	3000/1	IRIS	Nov-17
Vinyl Chloride	Chronic	3.0E-03	mg/kg-day	1	3.0E-03	mg/kg-day	Liver	30/1	IRIS	Nov-17
1,4-Dichlorobenzene	Chronic	7.0E-02	mg/kg-day	1	7.0E-02	mg/kg-day	Liver	100	ATSDR	Jun-17
Benzo(a)anthracene		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Benzo(a)pyrene	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Neurological	N/A	IRIS	Nov-17
Benzo(b)fluoranthene		NV	mg/kg-day	1	NV	mg/kg-day	NA			
bis(2-Ethylhexyl)phthalate	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Liver	1000/1	IRIS	Nov-17
Dibenzo(a,h)anthracene		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Indeno(1,2,3-cd)pyrene		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Naphthalene	Chronic	2.0E-02	mg/kg-day	1	2.0E-02	mg/kg-day	Body weight	3000/1	IRIS	Nov-17
Aldrin	Chronic	3.0E-05	mg/kg-day	1	3.0E-05	mg/kg-day	Liver	1000/1	IRIS	Nov-17
Chlordane	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver	300/1	IRIS	Dec-17
Dieldrin	Chronic	5.0E-05	mg/kg-day	1	5.0E-05	mg/kg-day	Liver	100/1	IRIS	Nov-17
4,4'-DDD	Chronic	3.0E-05	mg/kg-day	1	3.0E-05	mg/kg-day	Liver	300/1	Appendix PPRTV	Dec-17
4,4'-DDE	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Liver	3000/1	Appendix PPRTV	Dec-17
4,4'-DDT	Chronic	5.0E-04	mg/kg-day	1	5.0E-04	mg/kg-day	Liver	100/1	IRIS	Nov-17
Heptachlor epoxide	Chronic	1.3E-05	mg/kg-day	1	1.3E-05	mg/kg-day	Liver	1000/1	IRIS	Nov-17
Aroclor 1248		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Aroclor 1254	Chronic	2.0E-05	mg/kg-day	1	2.0E-05	mg/kg-day	Eyes, nails, immune system	300/1	IRIS	Nov-17
Aroclor 1260		NV	mg/kg-day	1	NV	mg/kg-day	NA			
High Risk PCBs		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Aluminum	Chronic	1.0E+00	mg/kg-day	1	1.0E+00	mg/kg-day	Neurological	100	PPRTV	Nov-17
Antimony	Chronic	4.0E-04	mg/kg-day	0.15	6.0E-05	mg/kg-day	Blood and longevity	1000	IRIS	Nov-17
Arsenic	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Skin/Vascular	3	IRIS	Nov-17
Barium	Chronic	2.0E-01	mg/kg-day	0.07	1.4E-02	mg/kg-day	Kidneys	300/1	IRIS	Nov-17
Beryllium	Chronic	2.0E-03	mg/kg-day	0.007	1.4E-05	mg/kg-day	Gastrointestinal Tract	300/1	IRIS	Nov-17
Cadmium	Chronic	5.0E-04	mg/kg-day	0.05	2.5E-05	mg/kg-day	Kidneys	10	IRIS	Nov-17
Chromium	Chronic	1.5E+00	mg/kg-day	0.013	2.0E-02	mg/kg-day	None Reported	100	IRIS	Nov-17
Chromium (as Hexavalent Compounds)	Chronic	3.0E-03	mg/kg-day	0.025	7.5E-05	mg/kg-day	None Reported	300	IRIS	Nov-17
Cobalt	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Thyroid	3000	PPRTV	Nov-17
Copper	Chronic	4.0E-02	mg/kg-day	1	4.0E-02	mg/kg-day	Gastrointestinal Tract	N/A	RSL/HEAST	Jun-17
Iron	Chronic	7.0E-01	mg/kg-day	1	7.0E-01	mg/kg-day	Gastrointestinal Tract	1.5	PPRTV	Nov-17
Lead [4]		NV	mg/kg-day	1	NV	mg/kg-day	NA			
Manganese	Chronic	2.4E-02	mg/kg-day	0.04	9.6E-04	mg/kg-day	Neurological	6	IRIS	Nov-17
Nickel[6]	Chronic	2.0E-02	mg/kg-day	0.04	8.0E-04	mg/kg-day	Body and organ weights	300	IRIS	Nov-17
Selenium	Chronic	5.0E-03	mg/kg-day	1	5.0E-03	mg/kg-day	Hair, nails, blood, teeth, skin, central nervous system	3/1	IRIS	Nov-17
Silver	Chronic	5.0E-03	mg/kg-day	0.04	2.0E-04	mg/kg-day	Skin	3/1	IRIS	Nov-17
Thallium	Chronic	1.0E-05	mg/kg-day	1	1.0E-05	mg/kg-day	Hair	3000	Appendix PPRTV	Nov-17
Vanadium	Chronic	5.0E-03	mg/kg-day	0.026	1.3E-04	mg/kg-day	Hair [5]	300	IRIS/RSL	Nov-17
Zinc	Chronic	3.0E-01	mg/kg-day	1	3.0E-01	mg/kg-day	Blood and immune system	3/1	IRIS	Nov-17
Mercury (elemental)	Chronic	3.0E-04	mg/kg-day	1	3.0E-04	mg/kg-day	Autoimmune effects	1000/1	IRIS	Nov-17
Methyl mercury	Chronic	1.0E-04	mg/kg-day	1	1.0E-04	mg/kg-day	Development, Neurological	100	IRIS	Dec-17
Cyanide	Chronic	6.0E-04	mg/kg-day	1	6.0E-04	mg/kg-day	Reproductive effects	3000/1	IRIS	Nov-17
Dioxins/Furans TEQ	Chronic	7.0E-10	mg/kg-day	1	7.0E-10	mg/kg-day	Development	30	IRIS	Nov-17

IRIS = EPA Integrated Risk Information System

RSL = Regional Screening Level Table

PPRTV = Provisional Peer-Reviewed Toxicity Value

ATSDR = Agency for Toxic Substance and Disease Registry

Oral-to-dermal adjustment factor for aluminum provided by J. Hubbard, EPA Region III

[1] EPA 2004. RAGS Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).

[2] Oral RfD*Oral to Dermal Adjustment Factor = Adjusted Dermal RfD

[3] For IRIS and PPRTV values, date that the online database was searched. For ATSDR, date of the most recent minimal risk levels.

[4] Lead toxicity will be evaluated using the integrated exposure uptake biokinetic (IEUBK) model and reference dose data are not applicable.

[5] Target organ for vanadium obtained from Agency for Toxic Substance and Disease Registry

[6] Toxicity values for nickel (soluble salts) used for oral/dermal exposure. Toxicity values for nickel (refinery dust) used for inhalation exposure.

Table 5.2
Non-Cancer Toxicity Data -- Inhalation
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	RfC Value	RfC Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (Mo-Yr) [1]
1,2,4-Trichlorobenzene	Chronic	2.0E-03	mg/m3	Urinary tract	3000	PPRTV	Nov-17
Chlorobenzene	Chronic	5.0E-02	mg/m3	Liver, kidneys	1000	PPRTV	Nov-17
cis-1,2-Dichloroethene		NV	mg/m3	NA			
Vinyl Chloride	Chronic	1.0E-01	mg/m3	Liver	30/1	IRIS	Nov-17
1,4-Dichlorobenzene	Chronic	8.0E-01	mg/m3	Liver	100/1	IRIS	Nov-17
Benzo(a)anthracene		NV	mg/m3	NA			
Benzo(a)pyrene	Chronic	2.0E-06	mg/m3	Fetotoxicity	N/A	IRIS	Nov-17
Benzo(b)fluoranthene		NV	mg/m3	NA			
bis(2-Ethylhexyl)phthalate		NV	mg/m3				
Dibenzo(a,h)anthracene		NV	mg/m3	NA			
Indeno(1,2,3-cd)pyrene		NV	mg/m3	NA			
Naphthalene	Chronic	3.0E-03	mg/m3	Nasal/respiratory	3000/1	IRIS	Nov-17
Aldrin		NV	mg/m3	NA			
Chlordane	Chronic	7.0E-04	mg/m3	Liver	1000/1	IRIS	Dec-17
Dieldrin		NV	mg/m3	NA			
4,4'-DDD		NV	mg/m3	NA			
4,4'-DDE		NV	mg/m3	NA			
4,4'-DDT		NV	mg/m3	NA			
Heptachlor epoxide		NV	mg/m3	NA			
Aroclor 1248		NV	mg/m3	NA			
Aroclor 1254		NV	mg/m3	NA			
Aroclor 1260		NV	mg/m3	NA			
High Risk PCB Congeners		NV	mg/m3	NA			
Aluminum	Chronic	5.0E-03	mg/m^3	Neurological	300	PPRTV	Nov-17
Antimony		NV	mg/m3	NA			
Arsenic	Chronic	1.5E-05	mg/m3	Development, Cardiovascular system, Nervous system, Lung, Skin		CalEPA	Nov-17
Barium	Chronic	5.0E-04	mg/m3	Fetotoxicity	1000	HEAST	Jun-17
Beryllium	Chronic	2.0E-05	mg/m3	Respiratory System, Immune System	10/1	IRIS	Nov-17
Cadmium	Chronic	1.0E-05	mg/m3	Kidneys	9	ATSDR	Nov-17
Chromium		NV	mg/m3	NA			
Chromium (Hexavalent Compounds)	Chronic	1.0E-04	mg/m3	Respiratory System	300	IRIS	Nov-17

Table 5.2
Non-Cancer Toxicity Data -- Inhalation
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Chronic/ Subchronic	RfC Value	RfC Units	Primary Target Organ	Combined Uncertainty/Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (Mo-Yr) [1]
Cobalt	Chronic	6.0E-06	mg/m3	Respiratory System	300	PPRTV	Nov-17
Copper		NV	mg/m3				
Iron		NV	mg/m3	NA			
Lead [2]		NV	mg/m3	NA			
Manganese	Chronic	5.0E-05	mg/m3	Neurological	1000	IRIS	Nov-17
Nickel [3]	Chronic	9.0E-05	mg/m3	Respiratory System	30	ATSDR	Nov-17
Selenium	Chronic	2.0E-02	mg/m3	Liver, cardiovascular system, neurological		CalEPA	Nov-17
Silver		NV	mg/m3				
Thallium		NV	mg/m3	NA			
Vanadium	Chronic	1.0E-04	mg/m3	Respiratory System	30	ATSDR	Nov-17
Zinc		NV	mg/m3				
Mercury (elemental)	Chronic	3.0E-04	mg/m3	Neurological	30/1	IRIS	Nov-17
Methyl mercury		NV	mg/m3				
Cyanide	Chronic	8.0E-04	mg/m3	Thyroid	3000/1	IRIS	Nov-17
Dioxins/Furans TEQ	Chronic	4.0E-08	mg/m3	Liver, development, reproduction, endocrine, respiratory, blood production	N/A	CalEPA	Nov-17

IRIS = EPA Integrated Risk Information System

NV = no toxicity value

PPRTV = EPA's Provisional Peer-Reviewed Toxicity Value

RSL = Regional Screening Level Table

CalEPA - Calfiornia Environmental Protection Agency

[1] For IRIS values, date that IRIS was searched

For RSL values, date table was downloaded

For PPRTV values, date the file was downloaded from the database

For CalEPA, date that database was searched

For ATSDR, date website was checked,

[2] Lead toxicity will be evaluated using the integrated exposure uptake biokinetic (IEUBK) model and reference dose data are not applicable.

[3] Toxicity values for nickel (soluble salts) used for oral/dermal exposure. Toxcity values for nickel (refinery dust) used for inahaltion exposure.

Table 6.1
Cancer Toxicity Data -- Oral/Dermal
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo-Yr) [3]
1,2,4-Trichlorobenzene	2.9E-02	1	2.9E-02	$(mg/kg\text{-}day)^{-1}$	B2	PPRTV	Nov-17
Chlorobenzene	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
cis-1,2-Dichloroethene	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Vinyl Chloride	7.2E-01	1	7.2E-01	$(mg/kg\text{-}day)^{-1}$	A	IRIS	Nov-17
1,4-Dichlorobenzene	5.4E-03	1	5.4E-03	$(mg/kg\text{-}day)^{-1}$	NV	CalEPA	Nov-17
Benzo(a)anthracene	1.0E-01	1	1.0E-01	$(mg/kg\text{-}day)^{-1}$	B2, mutagen	RSL/IRIS[4]	Nov-17
Benzo(a)pyrene	1.0E+00	1	1.0E+00	$(mg/kg\text{-}day)^{-1}$	A, mutagen	IRIS	Nov-17
Benzo(b)fluoranthene	1.0E-01	1	1.0E-01	$(mg/kg\text{-}day)^{-1}$	B2, mutagen	RSL/IRIS[4]	Nov-17
bis(2-Ethylhexyl)phthalate	1.4E-02	1	1.4E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Dibenzo(a,h)anthracene	1.0E+00	1	1.0E+00	$(mg/kg\text{-}day)^{-1}$	B2, mutagen	RSL/IRIS[4]	Nov-17
Indeno(1,2,3-cd)pyrene	1.0E-01	1	1.0E-01	$(mg/kg\text{-}day)^{-1}$	B2, mutagen	RSL/IRIS[4]	Nov-17
Naphthalene	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	C	IRIS	Nov-17
Aldrin	1.7E+01	1	1.7E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Chlordane	3.5E-01	1	3.5E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Dec-17
Dieldrin	1.6E+01	1	1.6E+01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
4,4'-DDD	2.4E-01	1	2.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Dec-17
4,4'-DDE	3.4E-01	1	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
4,4'-DDT	3.4E-01	1	3.4E-01	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Heptachlor epoxide	9.1E+00	1	9.1E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Aroclor 1248	2.0E+00	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Aroclor 1254	2.0E+00	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Aroclor 1260	2.0E+00	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
High Risk PCB Congeners	2.0E+00	1	2.0E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Aluminum	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	PPRTV	Nov-17
Antimony	NV	0.15	NV	$(mg/kg\text{-}day)^{-1}$	D	PPRTV	Nov-17
Arsenic	1.5E+00	1	1.5E+00	$(mg/kg\text{-}day)^{-1}$	A	IRIS	Nov-17
Barium	NV	0.07	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Beryllium	NV	0.007	NV	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	Nov-17
Cadmium	NV	0.025	NV	$(mg/kg\text{-}day)^{-1}$	B1	IRIS	Nov-17
Chromium	NV	0.013	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Chromium (Hexavalent Compounds)	5.0E-01	0.025	2.0E+01	$(mg/kg\text{-}day)^{-1}$	A, Mutagen	CalEPA	Nov-17
Cobalt	NV	1	NV	$(mg/kg\text{-}day)^{-1}$			

Table 6.1
Cancer Toxicity Data -- Oral/Dermal
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Oral Cancer Slope Factor	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo-Yr) [3]
Copper	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Iron	NV	1	NV	$(mg/kg\text{-}day)^{-1}$			
Lead	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	Nov-17
Manganese	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Nickel [5]	NV	0.04	NV	$(mg/kg\text{-}day)^{-1}$			
Selenium	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Silver	NV	0.04	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Thallium	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	PPRTV	Nov-17
Vanadium	NV	0.026	NV	$(mg/kg\text{-}day)^{-1}$	D	PPRTV	Nov-17
Zinc	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Mercury (elemental)	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Methyl mercury	NV	1	NV	(mg/kg-day)-1	C	IRIS	Nov-17
Cyanide	NV	1	NV	$(mg/kg\text{-}day)^{-1}$	D	IRIS	Nov-17
Dioxins/Furans TEQ	1.3E+05	1	1.3E+05	$(mg/kg\text{-}day)^{-1}$	NV	CalEPA	Nov-17

IRIS = Integrated Risk Information System
RSL = Regional Screening Level Table
NV= No toxicity value available
CalEPA = California Environmental Protection Agency
NJDEP = New Jersey Department of Environmental Protection
PPRTV = EPA's Provisional Peer-Reviewed Toxicity Value

Weight of Evidence:
A - Human carcinogen
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - possible human carcinogen

(1) EPA 2004. RAGS Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment).
(2) ORAL CSF/ Oral to Dermal Adjustment Factor = Adjusted Dermal CSF
(3) For IRIS, PPRTV, and CalEPA values, date that online database was searched.
For RSL values, date of table
[4] Weight of evidence from IRIS; slope factor from RSL Table
[5] Toxicity values for nickel (soluble salts) used for oral/dermal exposure. Toxicity values for nickel (refinery dust) used for inhalation exposure.

Table 6.2
Cancer Toxicity Data -- Inhalation
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Inhalation Unit Risk (per ug/m^3)	Inhalation Unit Risk per mg/m3	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo-Yr) [1]
1,2,4-Trichlorobenzene	NV	NV	D	IRIS	Nov-17
Chlorobenzene	NV	NV	D	IRIS	Nov-17
cis-1,2-Dichloroethene	NV	NV	D	IRIS	Nov-17
Vinyl Chloride	4.4E-06	4.4E-03	A	IRIS	Nov-17
1,4-Dichlorobenzene	1.1E-05	1.1E-02	NV	CalEPA	Nov-17
Benzo(a)anthracene	6.0E-05	6.0E-02	B2	RSL/IRIS[2]	Nov-17
Benzo(a)pyrene	6.0E-04	6.0E-01	A	IRIS	Nov-17
Benzo(b)fluoranthene	6.0E-05	6.0E-02	B2	RSL/IRIS[2]	Nov-17
bis(2-Ethylhexyl)phthalate	2.4E-06	2.4E-03	B2	CalEPA/IRIS[3]	Nov-17
Dibenzo(a,h)anthracene	6.0E-04	6.0E-01	B2	RSL/IRIS[2]	Nov-17
Indeno(1,2,3-cd)pyrene	6.0E-05	6.0E-02	B2	RSL/IRIS[2]	Nov-17
Naphthalene	3.4E-05	3.4E-02	C	CalEPA/IRIS[3]	Nov-17
Aldrin	4.9E-03	4.9E+00	B2	IRIS	Nov-17
Chlordane	1.0E-04	1.0E-01	B2	IRIS	Dec-17
Dieldrin	4.6E-03	4.6E+00	B2	IRIS	Nov-17
4,4'-DDD	6.9E-05	6.9E-02	B2	CalEPA/IRIS[3]	Dec-17
4,4'-DDE	9.7E-05	9.7E-02	B2	CalEPA/IRIS[3]	Nov-17
4,4'-DDT	9.7E-05	9.7E-02	B2	IRIS	Nov-17
Heptachlor epoxide	2.6E-03	2.6E+00	B2	IRIS	Nov-17
Aroclor 1248	5.7E-04	5.7E-01	B2	CalEPA/IRIS[3]	Nov-17
Aroclor 1254	5.7E-04	5.7E-01	B2	CalEPA/IRIS[3]	Nov-17
Aroclor 1260	5.7E-04	5.7E-01	B2	CalEPA/IRIS[3]	Nov-17
High Risk PCB Congeners	5.7E-04	5.7E-01	B2	CalEPA/IRIS[3]	Nov-17
Aluminum	NV	NV	D	PPRTV	Nov-17
Antimony	NV	NV	D	PPRTV	Nov-17
Arsenic	4.3E-03	4.3E+00	A	IRIS	Nov-17
Barium	NV	NV	D	IRIS	Nov-17
Beryllium	2.4E-03	2.4E+00	B1	IRIS	Nov-17
Cadmium	1.8E-03	1.8E+00	B1	IRIS	Nov-17
Chromium	NV	NV	D	IRIS	Nov-17

Table 6.2
Cancer Toxicity Data -- Inhalation
All Site Media - Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical of Potential Concern	Inhalation Unit Risk (per ug/m^3)	Inhalation Unit Risk per mg/m3	Weight of Evidence/ Cancer Guideline Description	Source	Date (Mo-Yr) [1]
Chromium (Hexavalent Compounds)	8.4E-02	8.4E+01	A	RSL/IRIS[4]	Nov-17
Cobalt	9.0E-03	9.0E+00	B2	PPRTV	Nov-17
Copper	NV	NV	D	IRIS	Nov-17
Iron	NV	NV			
Lead	NV	NV	B2	IRIS	Nov-17
Manganese	NV	NV	D	IRIS	Nov-17
Nickel [5]	2.4E-04	2.4E-01	A	IRIS	Nov-17
Selenium	NV	NV	D	IRIS	Nov-17
Silver	NV	NV	D	IRIS	Nov-17
Thallium	NV	NV	D	PPRTV	Nov-17
Vanadium	NV	NV	D	PPRTV	Nov-17
Zinc	NV	NV	D	IRIS	Nov-17
Mercury (elemental)	NV	NV	D	IRIS	Nov-17
Methyl mercury	NV	NV	C	IRIS	Dec-17
Cyanide	NV	NV	D	IRIS	Nov-17
Dioxins/Furans TEQ	3.8E+01	3.8E+04	NV	CalEPA	Nov-17

IRIS = Integrated Risk Information System

NV = no toxicity value

RSL = Oak Ridge National Laboratory Regional Screening Level Table

CalEPA = California Environmental Protection Agency

[1] For IRIS values, date that IRIS was searched

For RSL values, date table was downloaded

[2] IUR presented in the RSL table are calculated from the IUR for benzo[a]pyrene; cancer weight of evidence is from IRIS.

[3] IUR is from CalEPA; cancer weight of evidence is from IRIS.

[4] IUR presented in RSL table calculated from IRIS IUR; cancer weight of evidence is from IRIS.

[5] Toxicity values for nickel (soluble salts) used for oral/dermal exposure. Toxicity values for nickel (refinery dust) used for inhalation exposure.

TABLE 7.1
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	4.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	3.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Benzo(b)fluoranthene	2.2E+00	mg/kg	4.7E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	3.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	2.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	1.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	5.3E-06	mg/kg-day	2.0E-05	mg/kg-day	0.3
	Aroclor 1260	6.2E+00	mg/kg	1.4E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	2.6E-05	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	2.1E-01	mg/kg-day	1.0E+00	mg/kg-day	0.2
	Antimony	3.5E+01	mg/kg	7.6E-05	mg/kg-day	4.0E-04	mg/kg-day	0.2
	Arsenic	1.5E+01	mg/kg	1.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	Barium	4.3E+02	mg/kg	9.4E-04	mg/kg-day	2.0E-01	mg/kg-day	0.005
	Cadmium	2.0E+01	mg/kg	4.4E-05	mg/kg-day	1.0E-03	mg/kg-day	0.04
	Chromium (Total)	3.6E+02	mg/kg	7.9E-04	mg/kg-day	1.5E+00	mg/kg-day	0.001
	Chromium (Hexavalent)	1.8E+01	mg/kg	3.9E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	1.6E+02	mg/kg	3.6E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Copper	6.5E+03	mg/kg	1.4E-02	mg/kg-day	4.0E-02	mg/kg-day	0.4
	Iron	1.6E+05	mg/kg	3.6E-01	mg/kg-day	7.0E-01	mg/kg-day	0.5
	Manganese	6.8E+02	mg/kg	1.5E-03	mg/kg-day	2.4E-02	mg/kg-day	0.06
	Nickel	3.6E+02	mg/kg	7.9E-04	mg/kg-day	2.0E-02	mg/kg-day	0.04
	Silver	9.7E+00	mg/kg	2.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.004
	Thallium	1.0E+01	mg/kg	2.3E-05	mg/kg-day	1.0E-05	mg/kg-day	2
	Vanadium	2.6E+02	mg/kg	5.6E-04	mg/kg-day	5.0E-03	mg/kg-day	0.1
	Zinc	7.7E+03	mg/kg	1.7E-02	mg/kg-day	3.0E-01	mg/kg-day	0.06
	Mercury	7.7E+00	mg/kg	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	Dioxin-like PCBs	2.4E-04	mg/kg	5.2E-10	mg/kg-day	7.0E-10	mg/kg-day	0.7
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	1.1E-09	mg/kg-day	7.0E-10	mg/kg-day	2
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								8

TABLE 7.1
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	1.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Benzo(b)fluoranthene	2.2E+00	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	7.4E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0004
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	3.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	7.9E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	3.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	1.7E-06	mg/kg-day	2.0E-05	mg/kg-day	0.09
	Aroclor 1260	6.2E+00	mg/kg	4.5E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	8.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	5.0E-03	mg/kg-day	1.0E+00	mg/kg-day	0.005
	Antimony	3.5E+01	mg/kg	1.8E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	1.5E+01	mg/kg	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.008
	Barium	4.3E+02	mg/kg	2.2E-05	mg/kg-day	1.4E-02	mg/kg-day	0.002
	Cadmium	2.0E+01	mg/kg	1.0E-07	mg/kg-day	2.5E-05	mg/kg-day	0.004
	Chromium (Total)	3.6E+02	mg/kg	1.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	Chromium (Hexavalent)	1.8E+01	mg/kg	9.2E-07	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	1.6E+02	mg/kg	8.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Copper	6.5E+03	mg/kg	3.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.009
	Iron	1.6E+05	mg/kg	8.6E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Manganese	6.8E+02	mg/kg	3.5E-05	mg/kg-day	9.6E-04	mg/kg-day	0.04
	Nickel	3.6E+02	mg/kg	1.9E-05	mg/kg-day	8.0E-04	mg/kg-day	0.02
	Silver	9.7E+00	mg/kg	5.1E-07	mg/kg-day	2.0E-04	mg/kg-day	0.003
	Thallium	1.0E+01	mg/kg	5.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.05
	Vanadium	2.6E+02	mg/kg	1.3E-05	mg/kg-day	1.3E-04	mg/kg-day	0.1
	Zinc	7.7E+03	mg/kg	4.0E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	7.7E+00	mg/kg	4.0E-07	mg/kg-day	2.1E-05	mg/kg-day	0.019
	Dioxin-like PCBs	2.4E-04	mg/kg	1.7E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	8.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.8

TABLE 7.1
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	1.1E-08	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.3E-09	mg/m^3	3.5E-11	mg/m^3	2.0E-06	mg/m^3	0.00002
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	4.4E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	2.9E-10	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	1.1E-11	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	2.4E-11	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	6.9E-06	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	2.6E-06	mg/m^3	7.3E-08	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	4.4E-06	mg/m^3	1.2E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	2.1E-05	mg/m^3	5.6E-07	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.1E-05	mg/m^3	1.9E-06	mg/m^3	5.0E-03	mg/m^3	0.0004
	Antimony	2.5E-08	mg/m^3	7.0E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.1E-08	mg/m^3	3.0E-10	mg/m^3	1.5E-05	mg/m^3	0.00002
	Barium	3.2E-07	mg/m^3	8.6E-09	mg/m^3	5.0E-04	mg/m^3	0.00002
	Cadmium	1.5E-08	mg/m^3	4.1E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	2.6E-07	mg/m^3	7.2E-09	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	3.6E-10	mg/m^3	1.0E-04	mg/m^3	0.000004
	Cobalt	1.2E-07	mg/m^3	3.3E-09	mg/m^3	6.0E-06	mg/m^3	0.001
	Copper	4.8E-06	mg/m^3	1.3E-07	mg/m^3	NV	mg/m^3	NV
	Iron	1.2E-04	mg/m^3	3.3E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	5.0E-07	mg/m^3	1.4E-08	mg/m^3	5.0E-05	mg/m^3	0.0003
	Nickel	2.6E-07	mg/m^3	7.2E-09	mg/m^3	9.0E-05	mg/m^3	0.0001
	Silver	7.2E-09	mg/m^3	2.0E-10	mg/m^3	NV	mg/m^3	NV
	Thallium	7.6E-09	mg/m^3	2.1E-10	mg/m^3	NV	mg/m^3	NV
	Vanadium	1.9E-07	mg/m^3	5.2E-09	mg/m^3	1.0E-04	mg/m^3	0.00005
	Zinc	5.7E-06	mg/m^3	1.6E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	8.2E-04	mg/m^3	2.2E-05	mg/m^3	3.0E-04	mg/m^3	0.07
	Dioxin-like PCBs	1.1E-10	mg/m^3	3.1E-12	mg/m^3	4.0E-08	mg/m^3	0.0001
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	6.7E-12	mg/m^3	4.0E-08	mg/m^3	0.0002
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.08
							Total of Receptor Hazards Across All Media	9

TABLE 7.2
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	5.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	5.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	2.2E+00	mg/kg	6.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	4.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	1.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	3.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	1.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	7.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.04
	Aroclor 1260	6.2E+00	mg/kg	1.9E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	3.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	2.9E-02	mg/kg-day	1.0E+00	mg/kg-day	0.03
	Antimony	3.5E+01	mg/kg	1.0E-05	mg/kg-day	4.0E-04	mg/kg-day	0.03
	Arsenic	1.5E+01	mg/kg	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
	Barium	4.3E+02	mg/kg	1.3E-04	mg/kg-day	2.0E-01	mg/kg-day	0.0006
	Cadmium	2.0E+01	mg/kg	6.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.01
	Chromium (Total)	3.6E+02	mg/kg	1.1E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0001
	Chromium (Hexavalent)	1.8E+01	mg/kg	5.3E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
	Cobalt	1.6E+02	mg/kg	4.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Copper	6.5E+03	mg/kg	2.0E-03	mg/kg-day	4.0E-02	mg/kg-day	0.05
	Iron	1.6E+05	mg/kg	5.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.07
	Manganese	6.8E+02	mg/kg	2.0E-04	mg/kg-day	2.4E-02	mg/kg-day	0.009
	Nickel	3.6E+02	mg/kg	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Silver	9.7E+00	mg/kg	2.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0006
	Thallium	1.0E+01	mg/kg	3.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.3
	Vanadium	2.6E+02	mg/kg	7.7E-05	mg/kg-day	5.0E-03	mg/kg-day	0.02
	Zinc	7.7E+03	mg/kg	2.3E-03	mg/kg-day	3.0E-01	mg/kg-day	0.008
	Mercury	7.7E+00	mg/kg	2.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.008
	Dioxin-like PCBs	2.4E-04	mg/kg	7.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	1.5E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								1

TABLE 7.2
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	Benzo(a)anthracene	1.9E+00	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Benzo(b)fluoranthene	2.2E+00	mg/kg	1.7E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	8.7E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0004
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	4.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	9.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	4.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	2.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.1
	Aroclor 1260	6.2E+00	mg/kg	5.3E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	1.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	5.9E-03	mg/kg-day	1.0E+00	mg/kg-day	0.006
	Antimony	3.5E+01	mg/kg	2.1E-06	mg/kg-day	6.0E-05	mg/kg-day	0.04
	Arsenic	1.5E+01	mg/kg	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
	Barium	4.3E+02	mg/kg	2.6E-05	mg/kg-day	1.4E-02	mg/kg-day	0.002
	Cadmium	2.0E+01	mg/kg	1.2E-07	mg/kg-day	2.5E-05	mg/kg-day	0.005
	Chromium (Total)	3.6E+02	mg/kg	2.2E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	Chromium (Hexavalent)	1.8E+01	mg/kg	1.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	1.6E+02	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Copper	6.5E+03	mg/kg	4.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
	Iron	1.6E+05	mg/kg	1.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Manganese	6.8E+02	mg/kg	4.2E-05	mg/kg-day	9.6E-04	mg/kg-day	0.04
	Nickel	3.6E+02	mg/kg	2.2E-05	mg/kg-day	8.0E-04	mg/kg-day	0.03
	Silver	9.7E+00	mg/kg	6.0E-07	mg/kg-day	2.0E-04	mg/kg-day	0.003
	Thallium	1.0E+01	mg/kg	6.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Vanadium	2.6E+02	mg/kg	1.6E-05	mg/kg-day	1.3E-04	mg/kg-day	0.1
	Zinc	7.7E+03	mg/kg	4.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.002
	Mercury	7.7E+00	mg/kg	4.7E-07	mg/kg-day	2.1E-05	mg/kg-day	0.022
	Dioxin-like PCBs	2.4E-04	mg/kg	2.0E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	9.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.9

TABLE 7.2
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	1.1E-08	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.3E-09	mg/m^3	3.5E-11	mg/m^3	2.0E-06	mg/m^3	0.00002
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	4.4E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	2.9E-10	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	1.1E-11	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	2.4E-11	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	6.9E-06	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	2.6E-06	mg/m^3	7.3E-08	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	4.4E-06	mg/m^3	1.2E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	2.1E-05	mg/m^3	5.6E-07	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.1E-05	mg/m^3	1.9E-06	mg/m^3	5.0E-03	mg/m^3	0.0004
	Antimony	2.5E-08	mg/m^3	7.0E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.1E-08	mg/m^3	3.0E-10	mg/m^3	1.5E-05	mg/m^3	0.00002
	Barium	3.2E-07	mg/m^3	8.6E-09	mg/m^3	5.0E-04	mg/m^3	0.00002
	Cadmium	1.5E-08	mg/m^3	4.1E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	2.6E-07	mg/m^3	7.2E-09	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	3.6E-10	mg/m^3	1.0E-04	mg/m^3	0.000004
	Cobalt	1.2E-07	mg/m^3	3.3E-09	mg/m^3	6.0E-06	mg/m^3	0.0005
	Copper	4.8E-06	mg/m^3	1.3E-07	mg/m^3	NV	mg/m^3	NV
	Iron	1.2E-04	mg/m^3	3.3E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	5.0E-07	mg/m^3	1.4E-08	mg/m^3	5.0E-05	mg/m^3	0.0003
	Nickel	2.6E-07	mg/m^3	7.2E-09	mg/m^3	9.0E-05	mg/m^3	0.0001
	Silver	7.2E-09	mg/m^3	2.0E-10	mg/m^3	NV	mg/m^3	NV
	Thallium	7.6E-09	mg/m^3	2.1E-10	mg/m^3	NV	mg/m^3	NV
	Vanadium	1.9E-07	mg/m^3	5.2E-09	mg/m^3	1.0E-04	mg/m^3	0.00005
	Zinc	5.7E-06	mg/m^3	1.6E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	8.2E-04	mg/m^3	2.2E-05	mg/m^3	3.0E-04	mg/m^3	0.07
	Dioxin-like PCBs	1.1E-10	mg/m^3	3.1E-12	mg/m^3	4.0E-08	mg/m^3	0.0001
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	6.7E-12	mg/m^3	4.0E-08	mg/m^3	0.0002
	Bismuth-212	1.1E+00	pCi/g	NV	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	NV	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	NV	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	NV	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	NV	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	NV	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	NV	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	NV	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	NV	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	NV	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	NV	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	NV	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	NV	--	NV	--	NV
Inhalation Route Total								0.08
							Total of Receptor Hazards Across All Media	2

TABLE 7.3
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	3.9E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Benzo(b)fluoranthene	2.2E+00	mg/kg	4.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	2.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0001
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	1.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	2.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	9.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	4.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
	Aroclor 1260	6.2E+00	mg/kg	1.3E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	2.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	2.0E-02	mg/kg-day	1.0E+00	mg/kg-day	0.02
	Antimony	3.5E+01	mg/kg	7.1E-06	mg/kg-day	4.0E-04	mg/kg-day	0.02
	Arsenic	1.5E+01	mg/kg	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Barium	4.3E+02	mg/kg	8.8E-05	mg/kg-day	2.0E-01	mg/kg-day	0.0004
	Cadmium	2.0E+01	mg/kg	4.1E-06	mg/kg-day	1.0E-03	mg/kg-day	0.004
	Chromium (Total)	3.6E+02	mg/kg	7.4E-05	mg/kg-day	1.5E+00	mg/kg-day	0.00005
	Chromium (Hexavalent)	1.8E+01	mg/kg	3.6E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	1.6E+02	mg/kg	3.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Copper	6.5E+03	mg/kg	1.3E-03	mg/kg-day	4.0E-02	mg/kg-day	0.03
	Iron	1.6E+05	mg/kg	3.4E-02	mg/kg-day	7.0E-01	mg/kg-day	0.05
	Manganese	6.8E+02	mg/kg	1.4E-04	mg/kg-day	2.4E-02	mg/kg-day	0.006
	Nickel	3.6E+02	mg/kg	7.4E-05	mg/kg-day	2.0E-02	mg/kg-day	0.004
	Silver	9.7E+00	mg/kg	2.0E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0004
	Thallium	1.0E+01	mg/kg	2.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
	Vanadium	2.6E+02	mg/kg	5.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.01
	Zinc	7.7E+03	mg/kg	1.6E-03	mg/kg-day	3.0E-01	mg/kg-day	0.005
	Mercury	7.7E+00	mg/kg	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Dioxin-like PCBs	2.4E-04	mg/kg	4.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	1.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.7

TABLE 7.3
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	2.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0006
	Benzo(b)fluoranthene	2.2E+00	mg/kg	2.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	1.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00006
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	6.0E-08	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	1.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	5.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	2.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
	Aroclor 1260	6.2E+00	mg/kg	7.5E-07	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	1.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	8.3E-04	mg/kg-day	1.0E+00	mg/kg-day	0.001
	Antimony	3.5E+01	mg/kg	3.0E-07	mg/kg-day	6.0E-05	mg/kg-day	0.005
	Arsenic	1.5E+01	mg/kg	3.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Barium	4.3E+02	mg/kg	3.7E-06	mg/kg-day	1.4E-02	mg/kg-day	0.0003
	Cadmium	2.0E+01	mg/kg	1.7E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0007
	Chromium (Total)	3.6E+02	mg/kg	3.1E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	Chromium (Hexavalent)	1.8E+01	mg/kg	1.5E-07	mg/kg-day	7.5E-05	mg/kg-day	0.002
	Cobalt	1.6E+02	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Copper	6.5E+03	mg/kg	5.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.001
	Iron	1.6E+05	mg/kg	1.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.002
	Manganese	6.8E+02	mg/kg	5.9E-06	mg/kg-day	9.6E-04	mg/kg-day	0.006
	Nickel	3.6E+02	mg/kg	3.1E-06	mg/kg-day	8.0E-04	mg/kg-day	0.004
	Silver	9.7E+00	mg/kg	8.5E-08	mg/kg-day	2.0E-04	mg/kg-day	0.0004
	Thallium	1.0E+01	mg/kg	8.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.009
	Vanadium	2.6E+02	mg/kg	2.2E-06	mg/kg-day	1.3E-04	mg/kg-day	0.02
	Zinc	7.7E+03	mg/kg	6.7E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0002
	Mercury	7.7E+00	mg/kg	6.6E-08	mg/kg-day	2.1E-05	mg/kg-day	0.0032
	Dioxin-like PCBs	2.4E-04	mg/kg	2.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	1.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.1

TABLE 7.3
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	1.1E-08	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.3E-09	mg/m^3	3.5E-11	mg/m^3	2.0E-06	mg/m^3	0.00002
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	4.4E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	2.9E-10	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	1.1E-11	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	2.4E-11	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	6.9E-06	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	2.6E-06	mg/m^3	7.3E-08	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	4.4E-06	mg/m^3	1.2E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	2.1E-05	mg/m^3	5.6E-07	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.1E-05	mg/m^3	1.9E-06	mg/m^3	5.0E-03	mg/m^3	0.0004
	Antimony	2.5E-08	mg/m^3	7.0E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.1E-08	mg/m^3	3.0E-10	mg/m^3	1.5E-05	mg/m^3	0.00002
	Barium	3.2E-07	mg/m^3	8.6E-09	mg/m^3	5.0E-04	mg/m^3	0.00002
	Cadmium	1.5E-08	mg/m^3	4.1E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	2.6E-07	mg/m^3	7.2E-09	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	3.6E-10	mg/m^3	1.0E-04	mg/m^3	0.000004
	Cobalt	1.2E-07	mg/m^3	3.3E-09	mg/m^3	6.0E-06	mg/m^3	0.0005
	Copper	4.8E-06	mg/m^3	1.3E-07	mg/m^3	NV	mg/m^3	NV
	Iron	1.2E-04	mg/m^3	3.3E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	5.0E-07	mg/m^3	1.4E-08	mg/m^3	5.0E-05	mg/m^3	0.0003
	Nickel	2.6E-07	mg/m^3	7.2E-09	mg/m^3	9.0E-05	mg/m^3	0.00008
	Silver	7.2E-09	mg/m^3	2.0E-10	mg/m^3	NV	mg/m^3	NV
	Thallium	7.6E-09	mg/m^3	2.1E-10	mg/m^3	NV	mg/m^3	NV
	Vanadium	1.9E-07	mg/m^3	5.2E-09	mg/m^3	1.0E-04	mg/m^3	0.00005
	Zinc	5.7E-06	mg/m^3	1.6E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	8.2E-04	mg/m^3	2.2E-05	mg/m^3	3.0E-04	mg/m^3	0.07
	Dioxin-like PCBs	1.1E-10	mg/m^3	3.1E-12	mg/m^3	4.0E-08	mg/m^3	0.0001
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	6.7E-12	mg/m^3	4.0E-08	mg/m^3	0.0002
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.08
							Total of Receptor Hazards Across All Media	0.9

Table 7.4
Devent CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Conc (mg/L)	t* (hours)	tevent (hours)	Kp (cm/hour)	tau	B	FA	Devent (mg/cm2-event)
1,4-Dichlorobenzene - adult exposure	2.30E-03	1.71	0.71	4.20E-02	0.71	0.2	1	1.90E-07
1,4-Dichlorobenzene - child exposure	2.30E-03	1.71	0.54	4.20E-02	0.71	0.2	1	1.65E-07
1,4-Dichlorobenzene - Utility Worker exposure	2.30E-03	1.71	4	4.20E-02	0.71	0.2	1	4.86E-07
Naphthalene - adult exposure	1.30E-03	1.34	0.71	4.70E-02	0.56	0.2	1	1.07E-07
Naphthalene - child exposure	1.30E-03	1.34	0.54	4.70E-02	0.56	0.2	1	9.29E-08
Naphthalene - Utility Worker exposure	1.30E-03	1.34	4	4.70E-02	0.56	0.2	1	2.85E-07
Chlorobenzene - adult exposure	4.10E-02	1.09	0.71	2.80E-02	0.46	0.1	1	1.81E-06
Chlorobenzene - child exposure	4.10E-02	1.09	0.54	2.80E-02	0.46	0.1	1	1.58E-06
Chlorobenzene - Utility Worker exposure	4.10E-02	1.09	4	2.80E-02	0.46	0.1	1	5.34E-06
cis-1,2-Dichloroethene - adult exposure	9.29E-03	0.89	0.71	7.70E-03	0.37	0	1	1.01E-07
cis-1,2-Dichloroethene - child exposure	9.29E-03	0.89	0.54	7.70E-03	0.37	0	1	8.84E-08
cis-1,2-Dichloroethene - Utility Worker exposure	9.29E-03	0.89	4	7.70E-03	0.37	0	1	3.39E-07
Vinyl Chloride - adult exposure	5.10E-03	0.57	0.71	5.60E-03	0.24	0	1	3.40E-08
Vinyl Chloride - child exposure	5.10E-03	0.57	0.54	5.60E-03	0.24	0	1	2.84E-08
Vinyl Chloride - Utility Worker exposure	5.10E-03	0.57	4	5.60E-03	0.24	0	1	1.28E-07
Dioxin-like PCBs - adult exposure	1.1527E-10	50.31	0.71	1.66E+00	11.04	12.13	0.5	7.40E-13
Dioxin-like PCBs - child exposure	1.1527E-10	50.31	0.54	1.66E+00	11.04	12.13	0.5	6.46E-13
Dioxin-like PCBs - Utility Worker exposure	1.1527E-10	50.31	4	1.66E+00	11.04	12.13	0.5	1.76E-12
2,3,7,8-TCDD TEQ - adult exposure	4.5838E-09	29.47	0.71	8.08E-01	6.68	5.58	0.5	1.12E-11
2,3,7,8-TCDD TEQ - child exposure	4.5838E-09	29.47	0.54	8.08E-01	6.68	5.58	0.5	9.73E-12
2,3,7,8-TCDD TEQ - Utility Worker exposure	4.5838E-09	29.47	4	8.08E-01	6.68	5.58	0.5	2.65E-11
High risk PCBs - adult exposure	5.77E-05	19.45	0.71	5.45E-01	4.54	3.58	0.5	7.80E-08
High risk PCBs - child exposure	5.77E-05	19.45	0.54	5.45E-01	4.54	3.58	0.5	6.81E-08
High risk PCBs - Utility Worker exposure	5.77E-05	19.45	4	5.45E-01	4.54	3.58	0.5	1.85E-07

Notes:
Values obtained from RAGS Part E, Chapter 3 (metals) and Appendix B (organic compounds), or November 2017 RSL parameter table.
Values for PCB 156 used for dioxin-like PCBs

Table 7.5

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	1.7E-06	mg/kg-day	8.0E-04	mg/kg-day	0.002
				Mercury	6.0E-05	mg/m^3	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
				Vinyl chloride	5.8E-03	mg/m^3	1.6E-04	mg/kg-day	1.0E-01	mg/kg-day	0.002
			Exp. Route Total								0.009
	Exposure Medium Total										0.009
Groundwater Total											0.009

Table 7.6

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	1.7E-06	mg/kg-day	8.0E-04	mg/kg-day	0.002
				Mercury	6.0E-05	mg/m^3	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
				Vinyl chloride	5.8E-03	mg/m^3	1.6E-04	mg/kg-day	1.0E-01	mg/kg-day	0.002
			Exp. Route Total								0.009
	Exposure Medium Total										0.009
Groundwater Total											0.009

Table 7.7

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	1.7E-06	mg/kg-day	8.0E-04	mg/kg-day	0.002
				Mercury	6.0E-05	mg/m^3	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
				Vinyl chloride	5.8E-03	mg/m^3	1.6E-04	mg/kg-day	1.0E-01	mg/kg-day	0.002
			Exp. Route Total								0.009
	Exposure Medium Total										0.009
Groundwater Total											0.009

Table 7.8

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				Hazard Quotient
					Value	Units	Intake		RfD		
							Value	Units	Value	Units	
Groundwater	Water	Tap	Ingestion	Aluminum	8.0E-01	mg/L	4.0E-02	mg/kg-day	1.0E+00	mg/kg-day	0.04
				Antimony	1.9E-02	mg/L	9.7E-04	mg/kg-day	4.0E-04	mg/kg-day	2
				Arsenic	1.4E-02	mg/L	7.2E-04	mg/kg-day	3.0E-04	mg/kg-day	2
				Barium	3.2E-01	mg/L	1.6E-02	mg/kg-day	2.0E-01	mg/kg-day	0.08
				Cadmium	7.5E-04	mg/L	3.7E-05	mg/kg-day	5.0E-04	mg/kg-day	0.07
				Chromium (Trivalent)	4.4E-03	mg/L	2.2E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0001
				Chromium (Hexavalent)	1.2E-02	mg/L	6.2E-04	mg/kg-day	3.0E-03	mg/kg-day	0.2
				Cobalt	4.8E-02	mg/L	2.4E-03	mg/kg-day	3.0E-04	mg/kg-day	8
				Iron	1.8E+01	mg/L	8.7E-01	mg/kg-day	7.0E-01	mg/kg-day	1
				Manganese	3.9E-01	mg/L	1.9E-02	mg/kg-day	2.4E-02	mg/kg-day	0.8
				Mercury	1.7E-04	mg/L	8.5E-06	mg/kg-day	1.0E-04	mg/kg-day	0.08
				Nickel	2.1E-02	mg/L	1.0E-03	mg/kg-day	2.0E-02	mg/kg-day	0.05
				Selenium	8.5E-03	mg/L	4.2E-04	mg/kg-day	5.0E-03	mg/kg-day	0.08
				Thallium	1.1E-02	mg/L	5.2E-04	mg/kg-day	1.0E-05	mg/kg-day	52
				Vanadium	3.6E-03	mg/L	1.8E-04	mg/kg-day	5.0E-03	mg/kg-day	0.04
				Naphthalene	1.3E-03	mg/L	6.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.003
				Chlorobenzene	4.1E-02	mg/L	2.0E-03	mg/kg-day	2.0E-02	mg/kg-day	0.1
				cis-1,2-Dichloroethene	9.3E-03	mg/L	4.6E-04	mg/kg-day	2.0E-03	mg/kg-day	0.2
				Vinyl chloride	5.1E-03	mg/L	2.5E-04	mg/kg-day	3.0E-03	mg/kg-day	0.08
				1,4-Dichlorobenzene	2.3E-03	mg/L	1.1E-04	mg/kg-day	7.0E-02	mg/kg-day	0.002
				Cyanide	1.5E-02	mg/L	7.6E-04	mg/kg-day	6.0E-04	mg/kg-day	1
				Dioxin-Like PCBs	1.2E-10	mg/L	5.7E-12	mg/kg-day	7.0E-10	mg/kg-day	0.008
				High Risk PCBs	5.8E-05	mg/L	2.9E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	2.3E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
				Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								70

Table 7.8

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				Hazard Quotient
					Value	Units	Intake		RfD		
							Value	Units	Value	Units	
Groundwater	Water	Bath	Dermal contact	Aluminum	8.0E-01	mg/L	1.7E-04	mg/kg-day	1.0E+00	mg/kg-day	0.0002
				Antimony	1.9E-02	mg/L	4.3E-06	mg/kg-day	6.0E-05	mg/kg-day	0.07
				Arsenic	1.4E-02	mg/L	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Barium	3.2E-01	mg/L	7.1E-05	mg/kg-day	1.4E-02	mg/kg-day	0.005
				Cadmium	7.5E-04	mg/L	1.6E-07	mg/kg-day	2.5E-05	mg/kg-day	0.007
				Chromium (Trivalent)	4.4E-03	mg/L	9.7E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00005
				Chromium (Hexavalent)	1.2E-02	mg/L	5.5E-06	mg/kg-day	7.5E-05	mg/kg-day	0.07
				Cobalt	4.8E-02	mg/L	4.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Iron	1.8E+01	mg/L	3.8E-03	mg/kg-day	7.0E-01	mg/kg-day	0.005
				Manganese	3.9E-01	mg/L	8.6E-05	mg/kg-day	9.6E-04	mg/kg-day	0.09
				Mercury	1.7E-04	mg/L	3.7E-08	mg/kg-day	1.0E-04	mg/kg-day	0.0004
				Nickel	2.1E-02	mg/L	9.3E-07	mg/kg-day	8.0E-04	mg/kg-day	0.001
				Selenium	8.5E-03	mg/L	1.9E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0004
				Thallium	1.1E-02	mg/L	2.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
				Vanadium	3.6E-03	mg/L	7.9E-07	mg/kg-day	1.3E-04	mg/kg-day	0.01
				Naphthalene	1.3E-03	mg/L	3.8E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
				Chlorobenzene	4.1E-02	mg/L	6.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.03
				cis-1,2-Dichloroethene	9.3E-03	mg/L	3.6E-05	mg/kg-day	2.0E-03	mg/kg-day	0.02
				Vinyl chloride	5.1E-03	mg/L	1.2E-05	mg/kg-day	3.0E-03	mg/kg-day	0.004
				1,4-Dichlorobenzene	2.3E-03	mg/L	6.7E-05	mg/kg-day	7.0E-02	mg/kg-day	0.001
				Cyanide	1.5E-02	mg/L	3.4E-06	mg/kg-day	6.0E-04	mg/kg-day	0.01
				Dioxin-Like PCBs	1.2E-10	mg/L	2.6E-10	mg/kg-day	7.0E-10	mg/kg-day	0.4
				High Risk PCBs	5.8E-05	mg/L	2.8E-05	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	4.0E-09	mg/kg-day	7.0E-10	mg/kg-day	6
				Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								7
	Exposure Medium Total										77
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	6.1E-05	mg/kg-day	8.0E-04	mg/kg-day	0.08
				Mercury	6.0E-05	mg/m^3	5.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
				Vinyl chloride	5.8E-03	mg/m^3	5.6E-03	mg/kg-day	1.0E-01	mg/kg-day	0.06
			Exp. Route Total								0.3
	Exposure Medium Total										0.3
Groundwater Total											77

Table 7.9

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Water	Tap	Ingestion	Aluminum	8.0E-01	mg/L	2.4E-02	mg/kg-day	1.0E+00	mg/kg-day	0.02
				Antimony	1.9E-02	mg/L	5.8E-04	mg/kg-day	4.0E-04	mg/kg-day	1
				Arsenic	1.4E-02	mg/L	4.3E-04	mg/kg-day	3.0E-04	mg/kg-day	1
				Barium	3.2E-01	mg/L	9.7E-03	mg/kg-day	2.0E-01	mg/kg-day	0.05
				Cadmium	7.5E-04	mg/L	2.2E-05	mg/kg-day	5.0E-04	mg/kg-day	0.04
				Chromium (Trivalent)	4.4E-03	mg/L	1.3E-04	mg/kg-day	1.5E+00	mg/kg-day	0.00009
				Chromium (Hexavalent)	1.2E-02	mg/L	3.7E-04	mg/kg-day	3.0E-03	mg/kg-day	0.1
				Cobalt	4.8E-02	mg/L	1.4E-03	mg/kg-day	3.0E-04	mg/kg-day	5
				Iron	1.8E+01	mg/L	5.2E-01	mg/kg-day	7.0E-01	mg/kg-day	1
				Manganese	3.9E-01	mg/L	1.2E-02	mg/kg-day	2.4E-02	mg/kg-day	0.5
				Mercury	1.7E-04	mg/L	5.1E-06	mg/kg-day	1.0E-04	mg/kg-day	0.05
				Nickel	2.1E-02	mg/L	6.3E-04	mg/kg-day	2.0E-02	mg/kg-day	0.03
				Selenium	8.5E-03	mg/L	2.5E-04	mg/kg-day	5.0E-03	mg/kg-day	0.05
				Thallium	1.1E-02	mg/L	3.1E-04	mg/kg-day	1.0E-05	mg/kg-day	31
				Vanadium	3.6E-03	mg/L	1.1E-04	mg/kg-day	5.0E-03	mg/kg-day	0.02
				Naphthalene	1.3E-03	mg/L	3.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
				Chlorobenzene	4.1E-02	mg/L	1.2E-03	mg/kg-day	2.0E-02	mg/kg-day	0.1
				cis-1,2-Dichloroethene	9.3E-03	mg/L	2.8E-04	mg/kg-day	2.0E-03	mg/kg-day	0.1
				Vinyl chloride	5.1E-03	mg/L	1.5E-04	mg/kg-day	3.0E-03	mg/kg-day	0.05
				1,4-Dichlorobenzene	2.3E-03	mg/L	6.9E-05	mg/kg-day	7.0E-02	mg/kg-day	0.001
				Cyanide	1.5E-02	mg/L	4.6E-04	mg/kg-day	6.0E-04	mg/kg-day	1
				Dioxin-Like PCBs	1.2E-10	mg/L	3.5E-12	mg/kg-day	7.0E-10	mg/kg-day	0.005
				High Risk PCBs	5.8E-05	mg/L	1.7E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	1.4E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
				Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								42

Table 7.9

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Water	Bath	Dermal contact	Aluminum	8.0E-01	mg/L	1.3E-04	mg/kg-day	1.0E+00	mg/kg-day	0.0001
				Antimony	1.9E-02	mg/L	3.2E-06	mg/kg-day	6.0E-05	mg/kg-day	0.05
				Arsenic	1.4E-02	mg/L	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Barium	3.2E-01	mg/L	5.4E-05	mg/kg-day	1.4E-02	mg/kg-day	0.004
				Cadmium	7.5E-04	mg/L	1.2E-07	mg/kg-day	2.5E-05	mg/kg-day	0.005
				Chromium (Trivalent)	4.4E-03	mg/L	7.4E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00004
				Chromium (Hexavalent)	1.2E-02	mg/L	4.2E-06	mg/kg-day	7.5E-05	mg/kg-day	0.06
				Cobalt	4.8E-02	mg/L	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Iron	1.8E+01	mg/L	2.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.004
				Manganese	3.9E-01	mg/L	6.5E-05	mg/kg-day	9.6E-04	mg/kg-day	0.07
				Mercury	1.7E-04	mg/L	2.8E-08	mg/kg-day	1.0E-04	mg/kg-day	0.0003
				Nickel	2.1E-02	mg/L	3.5E-06	mg/kg-day	8.0E-04	mg/kg-day	0.004
				Selenium	8.5E-03	mg/L	1.4E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0003
				Thallium	1.1E-02	mg/L	1.8E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
				Vanadium	3.6E-03	mg/L	6.0E-07	mg/kg-day	1.3E-04	mg/kg-day	0.005
				Naphthalene	1.3E-03	mg/L	2.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
				Chlorobenzene	4.1E-02	mg/L	4.3E-04	mg/kg-day	2.0E-02	mg/kg-day	0.02
				cis-1,2-Dichloroethene	9.3E-03	mg/L	2.4E-05	mg/kg-day	2.0E-03	mg/kg-day	0.01
				Vinyl chloride	5.1E-03	mg/L	8.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.003
				1,4-Dichlorobenzene	2.3E-03	mg/L	4.5E-05	mg/kg-day	7.0E-02	mg/kg-day	0.001
				Cyanide	1.5E-02	mg/L	2.0E-06	mg/kg-day	6.0E-04	mg/kg-day	0.003
				Dioxin-Like PCBs	1.2E-10	mg/L	1.7E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
				High Risk PCBs	5.8E-05	mg/L	1.8E-05	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	2.6E-09	mg/kg-day	7.0E-10	mg/kg-day	4
				Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								4
	Exposure Medium Total										46
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	6.1E-05	mg/kg-day	8.0E-04	mg/kg-day	0.08
				Mercury	6.0E-05	mg/m^3	5.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
				Vinyl chloride	5.8E-03	mg/m^3	5.6E-03	mg/kg-day	1.0E-01	mg/kg-day	0.06
			Exp. Route Total								0.3
	Exposure Medium Total										0.3
Groundwater Total											47

Table 7.10

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air Inside an Open Excavation
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Air	Air Inside an Open Excavation	Inhalation	Cyanide	1.5E-01	mg/m^3	1.7E-02	mg/m^3	8.0E-04	mg/m^3	22
			Exp. Route Total								22
	Exposure Medium Total										22
Groundwater Total											22

Table 7.11
NON-CANCER HAZARDS AND CANCER RISKS, INHALATION PATHWAY FOR ADULT RESIDENTS SHOWERING
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Molecular Weight	k_l (cm/hr)	k_g (cm/hr)	HLC (atm-m^3/mol)	K_L (cm/hr)	K_{aL} (cm/hr)	Cw (ug/L)	Cwd (ug/L)	S (ug/m^3-min)	Ca (mg/m^3)	ET (hr/day)	Adjusted Ca for HQ (mg/m^3)	RfC (mg/m^3)	HQ
Naphthalene	128.17	11.71826032	1124.253673	4.40E-04	7.467897706	10.08762295	1.30E+00	0.104815293	0.087346078	0.005239717	0.1832074	3.83544E-05	0.003	0.01278
1,4-Dichlorobenzene	147	10.94202409	1049.781318	2.43E-03	9.919734209	13.39955934	2.30E+00	0.243005106	0.202504255	0.012147826	0.1832074	8.89212E-05	0.8	0.0001112
Chlorobenzene	112.56	12.50444129	1199.680128	3.11E-03	11.57258232	15.63222363	4.10E+01	5.007753638	4.173128032	0.250337614	0.1832074	0.001832454	0.05	0.03665
cis-1,2-Dichloroethene	96.944	13.47397901	1292.697889	4.08E-03	12.6947852	17.14809329	9.29E+00	1.236656226	1.030546855	0.061820447	0.1832074	0.000452521	NV	NV
Vinyl chloride	62.499	16.78107582	1609.981824	2.78E-02	16.63125898	22.46547508	5.10E+00	0.87073488	0.7256124	0.043528038	0.1832074	0.000318622	1.00E-01	0.003186
High Risk PCBs	291.99	7.763764348	744.8580543	4.15E-04	4.84195048	6.540498105	5.77E-02	0.003060721	0.002550601	0.000153005	0.1832074	1.11999E-06	NV	NV
Dioxin-like PCBs	360.88	6.983528773	670.0020017	1.43E-04	2.538325689	3.428765831	1.15E-07	3.24701E-09	2.70584E-09	1.62318E-10	0.1832074	1.18816E-12	4.00E-08	0.00002970
2,3,7,8-TCDD	321.98	7.393360551	709.3213946	5.00E-05	1.230477393	1.662126676	4.58E-06	6.30528E-08	5.2544E-08	3.15201E-09	0.1832074	2.30725E-11	4.00E-08	0.0005768
Cyanide	26.018	26.00874395	2495.287279	1.01E-04	7.47491459	10.09710135	1.53E+01	1.237934377	1.031611981	0.061884342	0.1832074	0.000452989	8.00E-04	0.6

R = universal gas constant	0.000082	atm-m3/mol-degK
T1	293	deg K
T2	318	deg K
u1	1.002	cp
u2	0.596	cp
FR	10	L/min
SV	12	m3
Ra	0.01667	1/min
Ds	30	minutes
t	43	minutes
EF	350	days/year
ED	20	years
AT - noncancer	175200	hours
AT - cancer	613200	

Table 7.12

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Water	Tap	Inhalation	Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.E+00
	Exposure Medium Total										0.E+00

Table 7.13

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				Hazard Quotient
					Value	Units	Intake		RfD		
							Value	Units	Value	Units	
Groundwater	Groundwater	Utility Trench	Dermal contact	Aluminum	8.0E-01	mg/L	1.0E-04	mg/kg-day	1.0E+00	mg/kg-day	0.0001
				Antimony	1.9E-02	mg/L	2.4E-06	mg/kg-day	6.0E-05	mg/kg-day	0.04
				Arsenic	1.4E-02	mg/L	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Barium	3.2E-01	mg/L	4.1E-05	mg/kg-day	1.4E-02	mg/kg-day	0.003
				Cadmium	7.5E-04	mg/L	9.4E-08	mg/kg-day	2.5E-05	mg/kg-day	0.004
				Chromium (Trivalent)	4.4E-03	mg/L	5.5E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00003
				Chromium (Hexavalent)	1.2E-02	mg/L	3.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.04
				Cobalt	4.8E-02	mg/L	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Iron	1.8E+01	mg/L	2.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
				Manganese	3.9E-01	mg/L	4.9E-05	mg/kg-day	9.6E-04	mg/kg-day	0.05
				Mercury	1.7E-04	mg/L	2.1E-08	mg/kg-day	1.0E-04	mg/kg-day	0.0002
				Nickel	2.1E-02	mg/L	2.7E-06	mg/kg-day	8.0E-04	mg/kg-day	0.003
				Selenium	8.5E-03	mg/L	1.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0002
				Thallium	1.1E-02	mg/L	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
				Vanadium	3.6E-03	mg/L	4.5E-07	mg/kg-day	1.3E-04	mg/kg-day	0.003
				Naphthalene	1.3E-03	mg/L	9.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.000
				Chlorobenzene	4.1E-02	mg/L	1.7E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
				cis-1,2-Dichloroethene	9.3E-03	mg/L	1.1E-05	mg/kg-day	2.0E-03	mg/kg-day	0.01
				Vinyl chloride	5.1E-03	mg/L	4.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
				1,4-Dichlorobenzene	2.3E-03	mg/L	1.5E-05	mg/kg-day	7.0E-02	mg/kg-day	0.000
				Cyanide	1.5E-02	mg/L	1.9E-06	mg/kg-day	6.0E-04	mg/kg-day	0.003
				Dioxin-Like PCBs	1.2E-10	mg/L	5.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
				High Risk PCBs	5.8E-05	mg/L	5.8E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	8.3E-10	mg/kg-day	7.0E-10	mg/kg-day	1
				Bismuth-214	1.0E+01	pCi/L	--	--	NV	--	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	--	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	--	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	--	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	--	NV
				Radium-226	1.0E+02	pCi/L	--	--	NV	--	NV
				Radium-228	5.7E+00	pCi/L	--	--	NV	--	NV
				Strontium-90	1.5E+00	pCi/L	--	--	NV	--	NV
			Exp. Route Total								2
	Exposure Medium Total										2
Groundwater	Air	Air Inside an Open Excavation	Inhalation	Cyanide	1.5E-01	mg/m^3	1.7E-02	mg/m^3	8.0E-04	mg/m^3	22
			Exp. Route Total								22
	Exposure Medium Total										22
Groundwater Total											23

Table 7.14

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	1.5E-05	mg/kg-day	8.0E-04	mg/kg-day	0.02
				Mercury	6.0E-05	mg/m^3	1.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.05
				Vinyl chloride	5.8E-03	mg/m^3	1.3E-03	mg/kg-day	1.0E-01	mg/kg-day	0.01
			Exp. Route Total								0.08
	Exposure Medium Total										0.08
Groundwater Total											0.08

TABLE 7.15
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User/Fisherman and Future Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	6.7E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
	Dieldrin	2.3E-03	mg/kg	2.0E-06	mg/kg-day	5.0E-05	mg/kg-day	0.04
	4,4'-DDD	1.3E-02	mg/kg	1.1E-05	mg/kg-day	3.0E-05	mg/kg-day	0.37
	4,4'-DDE	2.1E-02	mg/kg	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	4,4'-DDT	1.4E-01	mg/kg	1.2E-04	mg/kg-day	5.0E-04	mg/kg-day	0.2
	Aroclor 1254	8.0E-02	mg/kg	6.9E-05	mg/kg-day	2.0E-05	mg/kg-day	3
	High Risk PCB Congeners	8.8E-01	mg/kg	7.6E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	2.6E+02	mg/kg	2.3E-01	mg/kg-day	1.0E+00	mg/kg-day	0.2
	Arsenic	1.7E+00	mg/kg	1.5E-03	mg/kg-day	3.0E-04	mg/kg-day	5
	Chromium (Hexavalent)	2.3E-02	mg/kg	2.0E-05	mg/kg-day	3.0E-03	mg/kg-day	0.007
	Cobalt	2.5E-01	mg/kg	2.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	5.6E+00	mg/kg	4.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.1
	Iron	3.0E+02	mg/kg	2.6E-01	mg/kg-day	7.0E-01	mg/kg-day	0.4
	Manganese	1.1E+01	mg/kg	9.1E-03	mg/kg-day	2.4E-02	mg/kg-day	0.4
	Selenium	1.0E+00	mg/kg	8.6E-04	mg/kg-day	5.0E-03	mg/kg-day	0.2
	Zinc	1.9E+02	mg/kg	1.6E-01	mg/kg-day	3.0E-01	mg/kg-day	0.5
	Dioxin-like PCBs	2.8E-06	mg/kg	2.4E-09	mg/kg-day	7.0E-10	mg/kg-day	3
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	6.8E-08	mg/kg-day	7.0E-10	mg/kg-day	97
	Bismuth-214	1.8E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.8E-02	pCi/g	--	--	NV	--	NV
	Lead-214	2.0E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	3.7E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.6E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.2E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.4E-02	pCi/g	--	--	NV	--	NV
Fish Tissue Ingestion Route Total								112
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	1.4E-04	mg/kg-day	NV	mg/kg-day	NV
	Aldrin	1.9E-03	mg/kg	1.3E-06	mg/kg-day	3.0E-05	mg/kg-day	0.04
	Dieldrin	3.3E-03	mg/kg	2.2E-06	mg/kg-day	5.0E-05	mg/kg-day	0.04
	4,4'-DDD	1.2E-02	mg/kg	7.9E-06	mg/kg-day	3.0E-05	mg/kg-day	0.26
	4,4'-DDE	3.2E-02	mg/kg	2.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.07
	Heptachlor epoxide	3.2E-03	mg/kg	2.1E-06	mg/kg-day	1.3E-05	mg/kg-day	0.2
	Aroclor 1254	6.3E-02	mg/kg	4.2E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	High Risk PCB Congeners	1.5E-01	mg/kg	1.0E-04	mg/kg-day	NV	mg/kg-day	NV
	Arsenic	7.9E-01	mg/kg	5.2E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Cadmium	4.0E-01	mg/kg	2.6E-04	mg/kg-day	1.0E-03	mg/kg-day	0.3
	Chromium (Hexavalent)	5.2E-01	mg/kg	3.4E-04	mg/kg-day	3.0E-03	mg/kg-day	0.1
	Cobalt	2.8E-01	mg/kg	1.8E-04	mg/kg-day	3.0E-04	mg/kg-day	0.6
	Copper	4.8E+01	mg/kg	3.2E-02	mg/kg-day	4.0E-02	mg/kg-day	0.8
	Iron	1.5E+02	mg/kg	1.0E-01	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Zinc	1.2E+03	mg/kg	8.0E-01	mg/kg-day	3.0E-01	mg/kg-day	3
	Mercury	1.3E-01	mg/kg	8.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Dioxin-like PCBs	5.7E-06	mg/kg	3.7E-09	mg/kg-day	7.0E-10	mg/kg-day	5
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	1.1E-09	mg/kg-day	7.0E-10	mg/kg-day	2
	Bismuth-214	1.5E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.2E-02	pCi/g	--	--	NV	--	NV
	Lead-214	5.5E-02	pCi/g	--	--	NV	--	NV
	Potassium-40	3.2E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.3E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.1E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.0E-02	pCi/g	--	--	NV	--	NV
Shellfish Tissue Ingestion Route Total								16
							Total of Receptor Hazards Across All Media	128

TABLE 7.16
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	3.9E-05	mg/kg-day	5.0E-04	mg/kg-day	0.08
	Dieldrin	2.3E-03	mg/kg	1.2E-06	mg/kg-day	5.0E-05	mg/kg-day	0.02
	4,4'-DDD	1.3E-02	mg/kg	6.5E-06	mg/kg-day	3.0E-05	mg/kg-day	0.22
	4,4'-DDE	2.1E-02	mg/kg	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	4,4'-DDT	1.4E-01	mg/kg	7.0E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
	Aroclor 1254	8.0E-02	mg/kg	4.0E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	High Risk PCB Congeners	8.8E-01	mg/kg	4.4E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	2.6E+02	mg/kg	1.3E-01	mg/kg-day	1.0E+00	mg/kg-day	0.1
	Arsenic	1.7E+00	mg/kg	8.6E-04	mg/kg-day	3.0E-04	mg/kg-day	3
	Chromium (Hexavalent)	2.3E-02	mg/kg	1.2E-05	mg/kg-day	3.0E-03	mg/kg-day	0.004
	Cobalt	2.5E-01	mg/kg	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Copper	5.6E+00	mg/kg	2.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.07
	Iron	3.0E+02	mg/kg	1.5E-01	mg/kg-day	7.0E-01	mg/kg-day	0.2
	Manganese	1.1E+01	mg/kg	5.3E-03	mg/kg-day	2.4E-02	mg/kg-day	0.2
	Selenium	1.0E+00	mg/kg	5.0E-04	mg/kg-day	5.0E-03	mg/kg-day	0.1
	Zinc	1.9E+02	mg/kg	9.4E-02	mg/kg-day	3.0E-01	mg/kg-day	0.3
	Dioxin-like PCBs	2.8E-06	mg/kg	1.4E-09	mg/kg-day	7.0E-10	mg/kg-day	2
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	4.0E-08	mg/kg-day	7.0E-10	mg/kg-day	57
	Bismuth-214	1.8E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.8E-02	pCi/g	--	--	NV	--	NV
	Lead-214	2.0E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	3.7E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.6E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.2E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.4E-02	pCi/g	--	--	NV	--	NV
Fish Tissue Ingestion Route Total								66
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	9.7E-05	mg/kg-day	NV	mg/kg-day	NV
	Aldrin	1.9E-03	mg/kg	8.8E-07	mg/kg-day	3.0E-05	mg/kg-day	0.03
	Dieldrin	3.3E-03	mg/kg	1.5E-06	mg/kg-day	5.0E-05	mg/kg-day	0.03
	4,4'-DDD	1.2E-02	mg/kg	5.6E-06	mg/kg-day	3.0E-05	mg/kg-day	0.19
	4,4'-DDE	3.2E-02	mg/kg	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.05
	Heptachlor epoxide	3.2E-03	mg/kg	1.5E-06	mg/kg-day	1.3E-05	mg/kg-day	0.1
	Aroclor 1254	6.3E-02	mg/kg	2.9E-05	mg/kg-day	2.0E-05	mg/kg-day	1
	High Risk PCB Congeners	1.5E-01	mg/kg	7.1E-05	mg/kg-day	NV	mg/kg-day	NV
	Arsenic	7.9E-01	mg/kg	3.7E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Cadmium	4.0E-01	mg/kg	1.9E-04	mg/kg-day	1.0E-03	mg/kg-day	0.2
	Chromium (Hexavalent)	5.2E-01	mg/kg	2.4E-04	mg/kg-day	3.0E-03	mg/kg-day	0.08
	Cobalt	2.8E-01	mg/kg	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Copper	4.8E+01	mg/kg	2.2E-02	mg/kg-day	4.0E-02	mg/kg-day	0.6
	Iron	1.5E+02	mg/kg	7.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Zinc	1.2E+03	mg/kg	5.7E-01	mg/kg-day	3.0E-01	mg/kg-day	2
	Mercury	1.3E-01	mg/kg	6.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Dioxin-like PCBs	5.7E-06	mg/kg	2.6E-09	mg/kg-day	7.0E-10	mg/kg-day	4
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	7.7E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	Bismuth-214	1.5E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.2E-02	pCi/g	--	--	NV	--	NV
	Lead-214	5.5E-02	pCi/g	--	--	NV	--	NV
	Potassium-40	3.2E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.3E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.1E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.0E-02	pCi/g	--	--	NV	--	NV
Shellfish Tissue Ingestion Route Total								11
							Total of Receptor Hazards Across All Media	77

TABLE 7.17
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User and Future Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion of Fish Tissue	Chlordane	7.8E-02	mg/kg	3.9E-05	mg/kg-day	5.0E-04	mg/kg-day	0.08
	Dieldrin	2.3E-03	mg/kg	1.2E-06	mg/kg-day	5.0E-05	mg/kg-day	0.02
	4,4'-DDD	1.3E-02	mg/kg	6.5E-06	mg/kg-day	3.0E-05	mg/kg-day	0.22
	4,4'-DDE	2.1E-02	mg/kg	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	4,4'-DDT	1.4E-01	mg/kg	7.0E-05	mg/kg-day	5.0E-04	mg/kg-day	0.1
	Aroclor 1254	8.0E-02	mg/kg	4.0E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	High Risk PCB Congeners	8.8E-01	mg/kg	4.4E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	2.6E+02	mg/kg	1.3E-01	mg/kg-day	1.0E+00	mg/kg-day	0.1
	Arsenic	1.7E+00	mg/kg	8.6E-04	mg/kg-day	3.0E-04	mg/kg-day	3
	Chromium (Hexavalent)	2.3E-02	mg/kg	1.2E-05	mg/kg-day	3.0E-03	mg/kg-day	0.004
	Cobalt	2.5E-01	mg/kg	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Copper	5.6E+00	mg/kg	2.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.07
	Iron	3.0E+02	mg/kg	1.5E-01	mg/kg-day	7.0E-01	mg/kg-day	0.2
	Manganese	1.1E+01	mg/kg	5.3E-03	mg/kg-day	2.4E-02	mg/kg-day	0.2
	Selenium	1.0E+00	mg/kg	5.0E-04	mg/kg-day	5.0E-03	mg/kg-day	0.1
	Zinc	1.9E+02	mg/kg	9.4E-02	mg/kg-day	3.0E-01	mg/kg-day	0.3
	Dioxin-like PCBs	2.8E-06	mg/kg	1.4E-09	mg/kg-day	7.0E-10	mg/kg-day	2.0
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	4.0E-08	mg/kg-day	7.0E-10	mg/kg-day	57
	Bismuth-214	1.8E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.8E-02	pCi/g	--	--	NV	--	NV
	Lead-214	2.0E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	3.7E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.6E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.2E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.4E-02	pCi/g	--	--	NV	--	NV
Fish Tissue Ingestion Route Total								66
Ingestion of Shellfish Tissue	Benzo(b)fluoranthene	2.1E-01	mg/kg	1.1E-04	mg/kg-day	NV	mg/kg-day	NV
	Aldrin	1.9E-03	mg/kg	1.0E-06	mg/kg-day	3.0E-05	mg/kg-day	0.03
	Dieldrin	3.3E-03	mg/kg	1.7E-06	mg/kg-day	5.0E-05	mg/kg-day	0.03
	4,4'-DDD	1.2E-02	mg/kg	6.3E-06	mg/kg-day	3.0E-05	mg/kg-day	0.21
	4,4'-DDE	3.2E-02	mg/kg	1.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	Heptachlor epoxide	3.2E-03	mg/kg	1.7E-06	mg/kg-day	1.3E-05	mg/kg-day	0.1
	Aroclor 1254	6.3E-02	mg/kg	3.3E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	High Risk PCB Congeners	1.5E-01	mg/kg	8.1E-05	mg/kg-day	NV	mg/kg-day	NV
	Arsenic	7.9E-01	mg/kg	4.2E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Cadmium	4.0E-01	mg/kg	2.1E-04	mg/kg-day	1.0E-03	mg/kg-day	0.2
	Chromium (Hexavalent)	5.2E-01	mg/kg	2.7E-04	mg/kg-day	3.0E-03	mg/kg-day	0.09
	Cobalt	2.8E-01	mg/kg	1.5E-04	mg/kg-day	3.0E-04	mg/kg-day	0.5
	Copper	4.8E+01	mg/kg	2.5E-02	mg/kg-day	4.0E-02	mg/kg-day	0.6
	Iron	1.5E+02	mg/kg	8.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Zinc	1.2E+03	mg/kg	6.4E-01	mg/kg-day	3.0E-01	mg/kg-day	2
	Mercury	1.3E-01	mg/kg	6.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Dioxin-like PCBs	5.7E-06	mg/kg	3.0E-09	mg/kg-day	7.0E-10	mg/kg-day	4
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	8.8E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	Bismuth-214	1.5E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.2E-02	pCi/g	--	--	NV	--	NV
	Lead-214	5.5E-02	pCi/g	--	--	NV	--	NV
	Potassium-40	3.2E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.3E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.1E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.0E-02	pCi/g	--	--	NV	--	NV
Shellfish Tissue Ingestion Route Total								13
Total of Receptor Hazards Across All Media								79

TABLE 7.18
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Future Subsistence Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	1.6E-04	mg/kg-day	5.0E-04	mg/kg-day	0.3
	Dieldrin	2.3E-03	mg/kg	4.6E-06	mg/kg-day	5.0E-05	mg/kg-day	0.09
	4,4'-DDD	1.3E-02	mg/kg	2.6E-05	mg/kg-day	3.0E-05	mg/kg-day	0.87
	4,4'-DDE	2.1E-02	mg/kg	4.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.14
	4,4'-DDT	1.4E-01	mg/kg	2.8E-04	mg/kg-day	5.0E-04	mg/kg-day	0.6
	Aroclor 1254	8.0E-02	mg/kg	1.6E-04	mg/kg-day	2.0E-05	mg/kg-day	8
	High Risk PCB Congeners	8.8E-01	mg/kg	1.8E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	2.6E+02	mg/kg	5.3E-01	mg/kg-day	1.0E+00	mg/kg-day	0.5
	Arsenic	1.7E+00	mg/kg	3.4E-03	mg/kg-day	3.0E-04	mg/kg-day	11
	Chromium (Hexavalent)	2.3E-02	mg/kg	4.7E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	2.5E-01	mg/kg	5.0E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Copper	5.6E+00	mg/kg	1.1E-02	mg/kg-day	4.0E-02	mg/kg-day	0.3
	Iron	3.0E+02	mg/kg	6.0E-01	mg/kg-day	7.0E-01	mg/kg-day	0.9
	Manganese	1.1E+01	mg/kg	2.1E-02	mg/kg-day	2.4E-02	mg/kg-day	0.9
	Selenium	1.0E+00	mg/kg	2.0E-03	mg/kg-day	5.0E-03	mg/kg-day	0.4
	Zinc	1.9E+02	mg/kg	3.8E-01	mg/kg-day	3.0E-01	mg/kg-day	1
	Dioxin-like PCBs	2.8E-06	mg/kg	5.7E-09	mg/kg-day	7.0E-10	mg/kg-day	8
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	1.6E-07	mg/kg-day	7.0E-10	mg/kg-day	227
	Bismuth-214	1.8E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.8E-02	pCi/g	--	--	NV	--	NV
	Lead-214	2.0E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	3.7E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.6E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.2E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.4E-02	pCi/g	--	--	NV	--	NV
Fish Tissue Ingestion Route Total								263
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	5.0E-04	mg/kg-day	NV	mg/kg-day	NV
	Aldrin	1.9E-03	mg/kg	4.6E-06	mg/kg-day	3.0E-05	mg/kg-day	0.2
	Dieldrin	3.3E-03	mg/kg	7.9E-06	mg/kg-day	5.0E-05	mg/kg-day	0.2
	4,4'-DDD	1.2E-02	mg/kg	2.9E-05	mg/kg-day	3.0E-05	mg/kg-day	0.96
	4,4'-DDE	3.2E-02	mg/kg	7.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.25
	Heptachlor epoxide	3.2E-03	mg/kg	7.6E-06	mg/kg-day	1.3E-05	mg/kg-day	0.6
	Aroclor 1254	6.3E-02	mg/kg	1.5E-04	mg/kg-day	2.0E-05	mg/kg-day	8
	High Risk PCB Congeners	1.5E-01	mg/kg	3.7E-04	mg/kg-day	NV	mg/kg-day	NV
	Arsenic	7.9E-01	mg/kg	1.9E-03	mg/kg-day	3.0E-04	mg/kg-day	6
	Cadmium	4.0E-01	mg/kg	9.6E-04	mg/kg-day	1.0E-03	mg/kg-day	1
	Chromium (Hexavalent)	5.2E-01	mg/kg	1.2E-03	mg/kg-day	3.0E-03	mg/kg-day	0.4
	Cobalt	2.8E-01	mg/kg	6.6E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Copper	4.8E+01	mg/kg	1.2E-01	mg/kg-day	4.0E-02	mg/kg-day	3
	Iron	1.5E+02	mg/kg	3.6E-01	mg/kg-day	7.0E-01	mg/kg-day	0.5
	Zinc	1.2E+03	mg/kg	2.9E+00	mg/kg-day	3.0E-01	mg/kg-day	10
	Mercury	1.3E-01	mg/kg	3.1E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Dioxin-like PCBs	5.7E-06	mg/kg	1.4E-08	mg/kg-day	7.0E-10	mg/kg-day	19
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	4.0E-09	mg/kg-day	7.0E-10	mg/kg-day	5.7
	Bismuth-214	1.5E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.2E-02	pCi/g	--	--	NV	--	NV
	Lead-214	5.5E-02	pCi/g	--	--	NV	--	NV
	Potassium-40	3.2E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.3E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.1E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.0E-02	pCi/g	--	--	NV	--	NV
Shellfish Tissue Ingestion Route Total								59
Total of Receptor Hazards Across All Media								321

TABLE 7.19
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Future Subsistence Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	1.9E-04	mg/kg-day	5.0E-04	mg/kg-day	0.4
	Dieldrin	2.3E-03	mg/kg	5.5E-06	mg/kg-day	5.0E-05	mg/kg-day	0.1
	4,4'-DDD	1.3E-02	mg/kg	3.1E-05	mg/kg-day	3.0E-05	mg/kg-day	1.04
	4,4'-DDE	2.1E-02	mg/kg	5.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.17
	4,4'-DDT	1.4E-01	mg/kg	3.3E-04	mg/kg-day	5.0E-04	mg/kg-day	0.7
	Aroclor 1254	8.0E-02	mg/kg	1.9E-04	mg/kg-day	2.0E-05	mg/kg-day	10
	High Risk PCB Congeners	8.8E-01	mg/kg	2.1E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	2.6E+02	mg/kg	6.3E-01	mg/kg-day	1.0E+00	mg/kg-day	0.6
	Arsenic	1.7E+00	mg/kg	4.1E-03	mg/kg-day	3.0E-04	mg/kg-day	14
	Chromium (Hexavalent)	2.3E-02	mg/kg	5.6E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	2.5E-01	mg/kg	6.0E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Copper	5.6E+00	mg/kg	1.3E-02	mg/kg-day	4.0E-02	mg/kg-day	0.3
	Iron	3.0E+02	mg/kg	7.2E-01	mg/kg-day	7.0E-01	mg/kg-day	1
	Manganese	1.1E+01	mg/kg	2.5E-02	mg/kg-day	2.4E-02	mg/kg-day	1
	Selenium	1.0E+00	mg/kg	2.4E-03	mg/kg-day	5.0E-03	mg/kg-day	0.5
	Zinc	1.9E+02	mg/kg	4.5E-01	mg/kg-day	3.0E-01	mg/kg-day	1
	Dioxin-like PCBs	2.8E-06	mg/kg	6.8E-09	mg/kg-day	7.0E-10	mg/kg-day	10
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	1.9E-07	mg/kg-day	7.0E-10	mg/kg-day	270
	Bismuth-214	1.8E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.8E-02	pCi/g	--	--	NV	--	NV
	Lead-214	2.0E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	3.7E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.6E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.2E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.4E-02	pCi/g	--	--	NV	--	NV
Fish Tissue Ingestion Route Total								313
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	9.3E-04	mg/kg-day	NV	mg/kg-day	NV
	Aldrin	1.9E-03	mg/kg	8.4E-06	mg/kg-day	3.0E-05	mg/kg-day	0.3
	Dieldrin	3.3E-03	mg/kg	1.5E-05	mg/kg-day	5.0E-05	mg/kg-day	0.3
	4,4'-DDD	1.2E-02	mg/kg	5.3E-05	mg/kg-day	3.0E-05	mg/kg-day	1.76
	4,4'-DDE	3.2E-02	mg/kg	1.4E-04	mg/kg-day	3.0E-04	mg/kg-day	0.46
	Heptachlor epoxide	3.2E-03	mg/kg	1.4E-05	mg/kg-day	1.3E-05	mg/kg-day	1
	Aroclor 1254	6.3E-02	mg/kg	2.8E-04	mg/kg-day	2.0E-05	mg/kg-day	14
	High Risk PCB Congeners	1.5E-01	mg/kg	6.8E-04	mg/kg-day	NV	mg/kg-day	NV
	Arsenic	7.9E-01	mg/kg	3.5E-03	mg/kg-day	3.0E-04	mg/kg-day	12
	Cadmium	4.0E-01	mg/kg	1.8E-03	mg/kg-day	1.0E-03	mg/kg-day	2
	Chromium (Hexavalent)	5.2E-01	mg/kg	2.3E-03	mg/kg-day	3.0E-03	mg/kg-day	0.8
	Cobalt	2.8E-01	mg/kg	1.2E-03	mg/kg-day	3.0E-04	mg/kg-day	4
	Copper	4.8E+01	mg/kg	2.1E-01	mg/kg-day	4.0E-02	mg/kg-day	5
	Iron	1.5E+02	mg/kg	6.7E-01	mg/kg-day	7.0E-01	mg/kg-day	1
	Zinc	1.2E+03	mg/kg	5.4E+00	mg/kg-day	3.0E-01	mg/kg-day	18
	Mercury	1.3E-01	mg/kg	5.7E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Dioxin-like PCBs	5.7E-06	mg/kg	2.5E-08	mg/kg-day	7.0E-10	mg/kg-day	36
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	7.4E-09	mg/kg-day	7.0E-10	mg/kg-day	10.5
	Bismuth-214	1.5E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	4.2E-02	pCi/g	--	--	NV	--	NV
	Lead-214	5.5E-02	pCi/g	--	--	NV	--	NV
	Potassium-40	3.2E+00	pCi/g	--	--	NV	--	NV
	Radium-228	2.3E-01	pCi/g	--	--	NV	--	NV
	Strontium-90	1.1E-01	pCi/g	--	--	NV	--	NV
	Uranium-235	3.0E-02	pCi/g	--	--	NV	--	NV
Shellfish Tissue Ingestion Route Total								108
Total of Receptor Hazards Across All Media								421

TABLE 7.20
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Arsenic	3.0E+01	mg/kg	9.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Chromium (Hexavalent)	5.4E+01	mg/kg	3.0E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	5.3E+01	mg/kg	2.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Thallium	5.5E+00	mg/kg	3.0E-06	mg/kg-day	1.0E-05	mg/kg-day	0.3
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.6E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.7
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Arsenic	3.0E+01	mg/kg	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Chromium (Hexavalent)	5.4E+01	mg/kg	1.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	5.3E+01	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Thallium	5.5E+00	mg/kg	1.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.7E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.1
Total of Receptor Hazards Across All Media								0.7

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.21
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	3.0E+01	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Chromium (Hexavalent)	5.4E+01	mg/kg	4.1E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	5.3E+01	mg/kg	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	5.5E+00	mg/kg	4.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.04
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.09
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Arsenic	3.0E+01	mg/kg	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
	Chromium (Hexavalent)	5.4E+01	mg/kg	1.3E-06	mg/kg-day	7.5E-05	mg/kg-day	0.02
	Cobalt	5.3E+01	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Thallium	5.5E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.07
							Total of Receptor Hazards Across All Media	0.2

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.22
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0006
	Arsenic	3.0E+01	mg/kg	9.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	5.4E+01	mg/kg	2.8E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	5.3E+01	mg/kg	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	5.5E+00	mg/kg	2.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	3.0E+01	mg/kg	8.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	5.4E+01	mg/kg	5.0E-07	mg/kg-day	7.5E-05	mg/kg-day	0.007
	Cobalt	5.3E+01	mg/kg	4.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Thallium	5.5E+00	mg/kg	5.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.005
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.0E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
	Radium-226	6.1E-01	pCi/g	--	--	NV	--	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.03
							Total of Receptor Hazards Across All Media	0.09

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.23
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Northern Drainage Channel Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Arsenic	3.0E+01	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Chromium (Hexavalent)	5.4E+01	mg/kg	4.0E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	5.3E+01	mg/kg	3.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Thallium	5.5E+00	mg/kg	4.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.4
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
	Radium-226	6.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								0.9
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Arsenic	3.0E+01	mg/kg	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Chromium (Hexavalent)	5.4E+01	mg/kg	1.3E-06	mg/kg-day	7.5E-05	mg/kg-day	0.02
	Cobalt	5.3E+01	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Thallium	5.5E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
	Radium-226	6.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	5.7E-01	pCi/g	--	--	NV	pCi/g	NV
Dermal Absorption Route Total								0.07
Inhalation	Chromium (Hexavalent)	4.9E-07	mg/m^3	2.9E-08	mg/m^3	1.0E-04	mg/m^3	0.0003
	Mercury	6.6E-04	mg/m^3	3.9E-05	mg/m^3	3.0E-04	mg/m^3	0.1
	2,3,7,8-TCDD TEQ	3.8E-10	mg/m^3	2.3E-11	mg/m^3	4.0E-08	mg/m^3	0.001
Inhalation Absorption Route Total								0.1
							Total of Receptor Hazards Across All Media	1

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.24
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	6.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.1E-05	mg/kg-day	3.0E-03	mg/kg-day	0.004
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.02
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Hexavalent)	2.0E+01	mg/kg	3.9E-07	mg/kg-day	7.5E-05	mg/kg-day	0.005
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.009
							Total of Receptor Hazards Across All Media	0.03

Ingestion Intake Constant	5.47945E-07
Dermal Intake Constant	1.95041E-06

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.25
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	8.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.5E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0005
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.003
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Hexavalent)	2.0E+01	mg/kg	4.7E-07	mg/kg-day	7.5E-05	mg/kg-day	0.006
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.01
							Total of Receptor Hazards Across All Media	0.01

TABLE 7.26
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	5.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0003
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.002
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	5.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.9E-07	mg/kg-day	7.5E-05	mg/kg-day	0.002
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.004
						Total of Receptor Hazards Across All Media		0.006

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.27
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Freshwater Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	8.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.5E-05	mg/kg-day	3.0E-03	mg/kg-day	0.005
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								0.03
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Hexavalent)	2.0E+01	mg/kg	4.8E-07	mg/kg-day	7.5E-05	mg/kg-day	0.006
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	pCi/g	NV
Dermal Absorption Route Total								0.01
Inhalation	Arsenic	1.6E-07	mg/m^3	9.7E-09	mg/m^3	1.5E-05	mg/m^3	0.0006
	Chromium (Hexavalent)	1.8E-07	mg/m^3	1.1E-08	mg/m^3	1.0E-04	mg/m^3	0.0001
	Manganese	1.9E-06	mg/m^3	1.1E-07	mg/m^3	5.0E-05	mg/m^3	0.002
	Bismuth-212	8.5E-01	pCi/g	--	--	NV	--	NV
	Bismuth-214	9.3E-01	pCi/g	--	--	NV	--	NV
	Lead-212	7.3E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.0E+00	pCi/g	--	--	NV	--	NV
	Potassium-40	7.9E+00	pCi/g	--	--	NV	--	NV
	Radium-226	1.8E+00	pCi/g	--	--	NV	--	NV
	Radium-228	7.4E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.3E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	7.8E-01	pCi/g	--	--	NV	--	NV
Inhalation Absorption Route Total								0.003
							Total of Receptor Hazards Across All Media	0.05

Ingestion Intake Constant	7.36607E-07
Dermal Intake Constant	2.36183E-06
Inhalation Intake Constant	0.05952381

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.28
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	3.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.8E-04	mg/kg-day	3.0E-03	mg/kg-day	0.06
	Cobalt	1.7E+02	mg/kg	9.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Thallium	1.7E+00	mg/kg	9.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Dioxin-like PCBs	9.6E-05	mg/kg	5.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.6
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	8.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	3.2E+02	mg/kg	6.3E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
	Cobalt	1.7E+02	mg/kg	3.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	1.7E+00	mg/kg	3.3E-08	mg/kg-day	1.0E-05	mg/kg-day	0.003
	Dioxin-like PCBs	9.6E-05	mg/kg	2.6E-11	mg/kg-day	7.0E-10	mg/kg-day	0.038
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.4E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.1
							Total of Receptor Hazards Across All Media	0.7

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.29
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	4.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
	Arsenic	1.4E+01	mg/kg	6.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Chromium (Hexavalent)	3.2E+02	mg/kg	2.4E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	1.7E+02	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Thallium	1.7E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.6E-05	mg/kg	7.3E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.8E-12	mg/kg-day	7.0E-10	mg/kg-day	0.003
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.08
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	9.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	3.2E+02	mg/kg	7.4E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
	Cobalt	1.7E+02	mg/kg	4.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	1.7E+00	mg/kg	3.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
	Dioxin-like PCBs	9.6E-05	mg/kg	3.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.7E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.2
							Total of Receptor Hazards Across All Media	0.2

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.30
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	3.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0001
	Arsenic	1.4E+01	mg/kg	4.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.6E-05	mg/kg-day	3.0E-03	mg/kg-day	0.005
	Cobalt	1.7E+02	mg/kg	8.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Thallium	1.7E+00	mg/kg	8.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.6E-05	mg/kg	4.9E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.2E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	7.4E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
	Arsenic	1.4E+01	mg/kg	3.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Chromium (Hexavalent)	3.2E+02	mg/kg	3.0E-06	mg/kg-day	7.5E-05	mg/kg-day	0.04
	Cobalt	1.7E+02	mg/kg	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Thallium	1.7E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
	Dioxin-like PCBs	9.6E-05	mg/kg	1.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.018
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	6.7E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.07
							Total of Receptor Hazards Across All Media	0.1

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.31
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	6.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Arsenic	1.4E+01	mg/kg	9.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Chromium (Hexavalent)	3.2E+02	mg/kg	3.5E-04	mg/kg-day	3.0E-03	mg/kg-day	0.12
	Cobalt	1.7E+02	mg/kg	1.9E-04	mg/kg-day	3.0E-04	mg/kg-day	0.6
	Thallium	1.7E+00	mg/kg	1.8E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
	Dioxin-like PCBs	9.6E-05	mg/kg	1.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.6E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								1
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	3.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.3E-05	mg/kg-day	7.5E-05	mg/kg-day	0.2
	Cobalt	1.7E+02	mg/kg	6.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Thallium	1.7E+00	mg/kg	6.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.007
	Dioxin-like PCBs	9.6E-05	mg/kg	5.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.08
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.8E-12	mg/kg-day	7.0E-10	mg/kg-day	0.004
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.3
							Total of Receptor Hazards Across All Media	1

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.32
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	9.2E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
	Arsenic	1.4E+01	mg/kg	1.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Hexavalent)	3.2E+02	mg/kg	4.8E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	1.7E+02	mg/kg	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.09
	Thallium	1.7E+00	mg/kg	2.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Dioxin-like PCBs	9.6E-05	mg/kg	1.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.6E-12	mg/kg-day	7.0E-10	mg/kg-day	0.005
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.2
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	3.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.5E-05	mg/kg-day	7.5E-05	mg/kg-day	0.2
	Cobalt	1.7E+02	mg/kg	7.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Thallium	1.7E+00	mg/kg	7.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.6E-05	mg/kg	6.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.09
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.3E-12	mg/kg-day	7.0E-10	mg/kg-day	0.005
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.3
							Total of Receptor Hazards Across All Media	0.5

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.33
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	6.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
	Arsenic	1.4E+01	mg/kg	8.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	3.2E+02	mg/kg	3.3E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	1.7E+02	mg/kg	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	Thallium	1.7E+00	mg/kg	1.7E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
	Dioxin-like PCBs	9.6E-05	mg/kg	9.9E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.5E-12	mg/kg-day	7.0E-10	mg/kg-day	0.004
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.11
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0005
	Arsenic	1.4E+01	mg/kg	7.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	3.2E+02	mg/kg	6.0E-06	mg/kg-day	7.5E-05	mg/kg-day	0.08
	Cobalt	1.7E+02	mg/kg	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	1.7E+00	mg/kg	3.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.003
	Dioxin-like PCBs	9.6E-05	mg/kg	2.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.036
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.3E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	--	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	--	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.1
							Total of Receptor Hazards Across All Media	0.2

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.34
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Paradise Creek
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	4.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Arsenic	1.4E+01	mg/kg	6.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Chromium (Hexavalent)	3.2E+02	mg/kg	2.4E-04	mg/kg-day	3.0E-03	mg/kg-day	0.1
	Cobalt	1.7E+02	mg/kg	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Thallium	1.7E+00	mg/kg	1.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Dioxin-like PCBs	9.6E-05	mg/kg	7.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.8E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								0.8
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	9.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Chromium (Hexavalent)	3.2E+02	mg/kg	7.6E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
	Cobalt	1.7E+02	mg/kg	4.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Thallium	1.7E+00	mg/kg	4.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
	Dioxin-like PCBs	9.6E-05	mg/kg	3.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.05
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.7E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Dermal Absorption Route Total								0.2
Inhalation	Chromium (Total)	2.9E-06	mg/m^3	1.7E-07	mg/m^3	NV	mg/m^3	NV
	Cobalt	1.5E-06	mg/m^3	9.2E-08	mg/m^3	6.0E-06	mg/m^3	0.02
	Mercury	3.5E-04	mg/m^3	2.1E-05	mg/m^3	3.0E-04	mg/m^3	0.1
Inhalation Absorption Route Total								0.1
							Total of Receptor Hazards Across All Media	1

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.35
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Dock Construction Project within Paradise Creek
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	9.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Arsenic	1.4E+01	mg/kg	1.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Chromium (Hexavalent)	3.2E+02	mg/kg	4.7E-04	mg/kg-day	3.0E-03	mg/kg-day	0.2
	Cobalt	1.7E+02	mg/kg	2.5E-04	mg/kg-day	3.0E-04	mg/kg-day	0.8
	Thallium	1.7E+00	mg/kg	2.5E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
	Dioxin-like PCBs	9.6E-05	mg/kg	1.4E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								2
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	3.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.5E-05	mg/kg-day	7.5E-05	mg/kg-day	0.2
	Cobalt	1.7E+02	mg/kg	8.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Thallium	1.7E+00	mg/kg	7.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.6E-05	mg/kg	6.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.09
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.4E-12	mg/kg-day	7.0E-10	mg/kg-day	0.005
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	7.0E-01	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	1.9E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	9.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	8.1E-01	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Dermal Absorption Route Total								0.3
Inhalation	Chromium (Total)	2.9E-06	mg/m^3	4.8E-07	mg/m^3	NV	mg/m^3	NV
	Cobalt	1.5E-06	mg/m^3	2.6E-07	mg/m^3	6.0E-06	mg/m^3	0.04
	Mercury	3.5E-04	mg/m^3	5.8E-05	mg/m^3	3.0E-04	mg/m^3	0.2
Inhalation Absorption Route Total								0.2
							Total of Receptor Hazards Across All Media	2

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.36
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	9.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	1.7E+00	mg/kg	9.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	3.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	7.1E-07	mg/kg-day	2.0E-05	mg/kg-day	0.04
	Aroclor 1260	1.6E+00	mg/kg	8.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	2.1E-05	mg/kg-day	4.0E-04	mg/kg-day	0.05
	Arsenic	2.3E+01	mg/kg	7.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Chromium (Total)	5.1E+03	mg/kg	2.8E-03	mg/kg-day	1.5E+00	mg/kg-day	0.002
	Chromium (Hexavalent)	4.5E+01	mg/kg	2.4E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	4.3E+03	mg/kg	2.4E-03	mg/kg-day	3.0E-04	mg/kg-day	8
	Copper	6.2E+02	mg/kg	3.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
	Iron	5.0E+04	mg/kg	2.7E-02	mg/kg-day	7.0E-01	mg/kg-day	0.04
	Nickel	5.4E+03	mg/kg	2.9E-03	mg/kg-day	2.0E-02	mg/kg-day	0.1
	Thallium	6.6E+00	mg/kg	3.6E-06	mg/kg-day	1.0E-05	mg/kg-day	0.4
	Mercury	9.2E+00	mg/kg	5.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	1.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								9
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	5.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	4.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Benzo(b)fluoranthene	1.7E+00	mg/kg	4.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	3.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
	Aroclor 1260	1.6E+00	mg/kg	4.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	7.6E-07	mg/kg-day	6.0E-05	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Chromium (Total)	5.1E+03	mg/kg	1.0E-04	mg/kg-day	2.0E-02	mg/kg-day	0.005
	Chromium (Hexavalent)	4.5E+01	mg/kg	8.7E-07	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	4.3E+03	mg/kg	8.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Copper	6.2E+02	mg/kg	1.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0003
	Iron	5.0E+04	mg/kg	9.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
	Nickel	5.4E+03	mg/kg	1.0E-04	mg/kg-day	8.0E-04	mg/kg-day	0.1
	Thallium	6.6E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Mercury	9.2E+00	mg/kg	1.8E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0085
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.0E-12	mg/kg-day	7.0E-10	mg/kg-day	0.003
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.5
Total of Receptor Hazards Across All Media								9

TABLE 7.37
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.3E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0004
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	3.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	4.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	9.7E-08	mg/kg-day	2.0E-05	mg/kg-day	0.005
	Aroclor 1260	1.6E+00	mg/kg	1.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	2.9E-06	mg/kg-day	4.0E-04	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Total)	5.1E+03	mg/kg	3.8E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0003
	Chromium (Hexavalent)	4.5E+01	mg/kg	3.4E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	4.3E+03	mg/kg	3.3E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Copper	6.2E+02	mg/kg	4.7E-05	mg/kg-day	4.0E-02	mg/kg-day	0.001
	Iron	5.0E+04	mg/kg	3.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Nickel	5.4E+03	mg/kg	4.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.02
	Thallium	6.6E+00	mg/kg	5.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.05
	Mercury	9.2E+00	mg/kg	6.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.6E-12	mg/kg-day	7.0E-10	mg/kg-day	0.004
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								1
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	6.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	5.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	1.7E+00	mg/kg	5.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	1.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	4.2E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
	Aroclor 1260	1.6E+00	mg/kg	5.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	9.0E-07	mg/kg-day	6.0E-05	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Chromium (Total)	5.1E+03	mg/kg	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	0.006
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.0E-06	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	4.3E+03	mg/kg	1.0E-04	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Copper	6.2E+02	mg/kg	1.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0004
	Iron	5.0E+04	mg/kg	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.002
	Nickel	5.4E+03	mg/kg	1.2E-04	mg/kg-day	8.0E-04	mg/kg-day	0.2
	Thallium	6.6E+00	mg/kg	1.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
	Mercury	9.2E+00	mg/kg	2.1E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0101
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.4E-12	mg/kg-day	7.0E-10	mg/kg-day	0.003
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.6
Total of Receptor Hazards Across All Media								2

TABLE 7.38
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	8.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
	Benzo(b)fluoranthene	1.7E+00	mg/kg	8.6E-08	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	2.9E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	6.6E-08	mg/kg-day	2.0E-05	mg/kg-day	0.003
	Aroclor 1260	1.6E+00	mg/kg	8.3E-08	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	2.0E-06	mg/kg-day	4.0E-04	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	7.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Chromium (Total)	5.1E+03	mg/kg	2.6E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0002
	Chromium (Hexavalent)	4.5E+01	mg/kg	2.3E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	4.3E+03	mg/kg	2.2E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	6.2E+02	mg/kg	3.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.001
	Iron	5.0E+04	mg/kg	2.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.004
	Nickel	5.4E+03	mg/kg	2.8E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Thallium	6.6E+00	mg/kg	3.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Mercury	9.2E+00	mg/kg	4.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	1.8E-12	mg/kg-day	7.0E-10	mg/kg-day	0.003
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.8
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	2.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	2.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0007
	Benzo(b)fluoranthene	1.7E+00	mg/kg	2.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	4.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	7.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	1.7E-07	mg/kg-day	2.0E-05	mg/kg-day	0.01
	Aroclor 1260	1.6E+00	mg/kg	2.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	3.6E-07	mg/kg-day	6.0E-05	mg/kg-day	0.006
	Arsenic	2.3E+01	mg/kg	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Chromium (Total)	5.1E+03	mg/kg	4.7E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
	Chromium (Hexavalent)	4.5E+01	mg/kg	4.1E-07	mg/kg-day	7.5E-05	mg/kg-day	0.006
	Cobalt	4.3E+03	mg/kg	4.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Copper	6.2E+02	mg/kg	5.8E-06	mg/kg-day	4.0E-02	mg/kg-day	0.0001
	Iron	5.0E+04	mg/kg	4.6E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0007
	Nickel	5.4E+03	mg/kg	5.0E-05	mg/kg-day	8.0E-04	mg/kg-day	0.06
	Thallium	6.6E+00	mg/kg	6.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.006
	Mercury	9.2E+00	mg/kg	8.5E-08	mg/kg-day	2.1E-05	mg/kg-day	0.0041
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	9.6E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.2
							Total of Receptor Hazards Across All Media	1

TABLE 7.39
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	2.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	4.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	6.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	1.4E-06	mg/kg-day	2.0E-05	mg/kg-day	0.07
	Aroclor 1260	1.6E+00	mg/kg	1.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	4.3E-05	mg/kg-day	4.0E-04	mg/kg-day	0.11
	Arsenic	2.3E+01	mg/kg	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.05
	Chromium (Total)	5.1E+03	mg/kg	5.6E-03	mg/kg-day	1.5E+00	mg/kg-day	0.004
	Chromium (Hexavalent)	4.5E+01	mg/kg	4.9E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	4.3E+03	mg/kg	4.8E-03	mg/kg-day	3.0E-04	mg/kg-day	16
	Copper	6.2E+02	mg/kg	6.8E-04	mg/kg-day	4.0E-02	mg/kg-day	0.02
	Iron	5.0E+04	mg/kg	5.4E-02	mg/kg-day	7.0E-01	mg/kg-day	0.08
	Nickel	5.4E+03	mg/kg	5.9E-03	mg/kg-day	2.0E-02	mg/kg-day	0.3
	Thallium	6.6E+00	mg/kg	7.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.7
	Mercury	9.2E+00	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	3.8E-11	mg/kg-day	7.0E-10	mg/kg-day	0.05
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								17
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	1.7E+00	mg/kg	8.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	3.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	7.0E-07	mg/kg-day	2.0E-05	mg/kg-day	0.04
	Aroclor 1260	1.6E+00	mg/kg	8.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	1.5E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	2.3E+01	mg/kg	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
	Chromium (Total)	5.1E+03	mg/kg	2.0E-04	mg/kg-day	2.0E-02	mg/kg-day	0.010
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.7E-06	mg/kg-day	7.5E-05	mg/kg-day	0.02
	Cobalt	4.3E+03	mg/kg	1.7E-04	mg/kg-day	3.0E-04	mg/kg-day	0.6
	Copper	6.2E+02	mg/kg	2.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0006
	Iron	5.0E+04	mg/kg	1.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
	Nickel	5.4E+03	mg/kg	2.1E-04	mg/kg-day	8.0E-04	mg/kg-day	0.3
	Thallium	6.6E+00	mg/kg	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Mercury	9.2E+00	mg/kg	3.6E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0170
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	4.0E-12	mg/kg-day	7.0E-10	mg/kg-day	0.006
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								1
Total of Receptor Hazards Across All Media								18

TABLE 7.40
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	3.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
	Benzo(b)fluoranthene	1.7E+00	mg/kg	2.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	6.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	8.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	1.9E-07	mg/kg-day	2.0E-05	mg/kg-day	0.010
	Aroclor 1260	1.6E+00	mg/kg	2.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	5.9E-06	mg/kg-day	4.0E-04	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
	Chromium (Total)	5.1E+03	mg/kg	7.7E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0005
	Chromium (Hexavalent)	4.5E+01	mg/kg	6.7E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
	Cobalt	4.3E+03	mg/kg	6.6E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Copper	6.2E+02	mg/kg	9.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.002
	Iron	5.0E+04	mg/kg	7.5E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Nickel	5.4E+03	mg/kg	8.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.04
	Thallium	6.6E+00	mg/kg	9.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.10
	Mercury	9.2E+00	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	5.2E-12	mg/kg-day	7.0E-10	mg/kg-day	0.007
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								2
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	3.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	8.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.04
	Aroclor 1260	1.6E+00	mg/kg	1.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	1.8E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	2.3E+01	mg/kg	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Chromium (Total)	5.1E+03	mg/kg	2.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Chromium (Hexavalent)	4.5E+01	mg/kg	2.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.03
	Cobalt	4.3E+03	mg/kg	2.0E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	6.2E+02	mg/kg	2.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0007
	Iron	5.0E+04	mg/kg	2.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
	Nickel	5.4E+03	mg/kg	2.5E-04	mg/kg-day	8.0E-04	mg/kg-day	0.3
	Thallium	6.6E+00	mg/kg	3.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Mercury	9.2E+00	mg/kg	4.2E-07	mg/kg-day	2.1E-05	mg/kg-day	0.02
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	4.8E-12	mg/kg-day	7.0E-10	mg/kg-day	0.007
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								1
							Total of Receptor Hazards Across All Media	4

TABLE 7.41
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	2.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0006
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	4.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	5.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	1.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.007
	Aroclor 1260	1.6E+00	mg/kg	1.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	4.0E-06	mg/kg-day	4.0E-04	mg/kg-day	0.01
	Arsenic	2.3E+01	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Chromium (Total)	5.1E+03	mg/kg	5.2E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0003
	Chromium (Hexavalent)	4.5E+01	mg/kg	4.6E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
	Cobalt	4.3E+03	mg/kg	4.5E-04	mg/kg-day	3.0E-04	mg/kg-day	1
	Copper	6.2E+02	mg/kg	6.4E-05	mg/kg-day	4.0E-02	mg/kg-day	0.002
	Iron	5.0E+04	mg/kg	5.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.007
	Nickel	5.4E+03	mg/kg	5.5E-04	mg/kg-day	2.0E-02	mg/kg-day	0.03
	Thallium	6.6E+00	mg/kg	6.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.07
	Mercury	9.2E+00	mg/kg	9.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	3.6E-12	mg/kg-day	7.0E-10	mg/kg-day	0.005
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								2
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	5.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	4.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0014
	Benzo(b)fluoranthene	1.7E+00	mg/kg	4.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	9.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	3.4E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
	Aroclor 1260	1.6E+00	mg/kg	4.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	7.2E-07	mg/kg-day	6.0E-05	mg/kg-day	0.012
	Arsenic	2.3E+01	mg/kg	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Chromium (Total)	5.1E+03	mg/kg	9.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.005
	Chromium (Hexavalent)	4.5E+01	mg/kg	8.3E-07	mg/kg-day	7.5E-05	mg/kg-day	0.011
	Cobalt	4.3E+03	mg/kg	8.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Copper	6.2E+02	mg/kg	1.2E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0003
	Iron	5.0E+04	mg/kg	9.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0013
	Nickel	5.4E+03	mg/kg	1.0E-04	mg/kg-day	8.0E-04	mg/kg-day	0.13
	Thallium	6.6E+00	mg/kg	1.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.012
	Mercury	9.2E+00	mg/kg	1.7E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0081
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	1.9E-12	mg/kg-day	7.0E-10	mg/kg-day	0.003
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.5
						Total of Receptor Hazards Across All Media		2

TABLE 7.42
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Estuarine Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.9E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	4.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	9.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.05
	Aroclor 1260	1.6E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	2.9E-05	mg/kg-day	4.0E-04	mg/kg-day	0.07
	Arsenic	2.3E+01	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Chromium (Total)	5.1E+03	mg/kg	3.8E-03	mg/kg-day	1.5E+00	mg/kg-day	0.003
	Chromium (Hexavalent)	4.5E+01	mg/kg	3.3E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
	Cobalt	4.3E+03	mg/kg	3.2E-03	mg/kg-day	3.0E-04	mg/kg-day	11
	Copper	6.2E+02	mg/kg	4.6E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
	Iron	5.0E+04	mg/kg	3.7E-02	mg/kg-day	7.0E-01	mg/kg-day	0.05
	Nickel	5.4E+03	mg/kg	4.0E-03	mg/kg-day	2.0E-02	mg/kg-day	0.2
	Thallium	6.6E+00	mg/kg	4.8E-06	mg/kg-day	1.0E-05	mg/kg-day	0.5
	Mercury	9.2E+00	mg/kg	6.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								12
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	6.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	5.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	1.7E+00	mg/kg	5.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	1.9E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	4.3E-07	mg/kg-day	2.0E-05	mg/kg-day	0.02
	Aroclor 1260	1.6E+00	mg/kg	5.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	9.2E-07	mg/kg-day	6.0E-05	mg/kg-day	0.02
	Arsenic	2.3E+01	mg/kg	1.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Chromium (Total)	5.1E+03	mg/kg	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	0.006
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	4.3E+03	mg/kg	1.0E-04	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Copper	6.2E+02	mg/kg	1.5E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0004
	Iron	5.0E+04	mg/kg	1.2E-03	mg/kg-day	7.0E-01	mg/kg-day	0.002
	Nickel	5.4E+03	mg/kg	1.3E-04	mg/kg-day	8.0E-04	mg/kg-day	0.2
	Thallium	6.6E+00	mg/kg	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
	Mercury	9.2E+00	mg/kg	2.2E-07	mg/kg-day	2.1E-05	mg/kg-day	0.010
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.4E-12	mg/kg-day	7.0E-10	mg/kg-day	0.0
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.6
Inhalation	Aroclor 1248	2.3E-05	mg/m^3	1.4E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	4.0E-06	mg/m^3	2.4E-07	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	3.2E-06	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Total)	4.6E-05	mg/m^3	2.7E-06	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	4.0E-07	mg/m^3	2.4E-08	mg/m^3	1.0E-04	mg/m^3	0.0002
	Cobalt	3.9E-05	mg/m^3	2.3E-06	mg/m^3	6.0E-06	mg/m^3	0.4
	Nickel	4.8E-05	mg/m^3	2.9E-06	mg/m^3	9.0E-05	mg/m^3	0.03
	Mercury	4.6E-03	mg/m^3	2.8E-04	mg/m^3	3.0E-04	mg/m^3	0.9
Inhalation Absorption Route Total								1
							Total of Receptor Hazards Across All Media	14

TABLE 7.43
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Dock Construction Project within Estuarine Wetland
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	3.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.008
	Benzo(b)fluoranthene	1.7E+00	mg/kg	2.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	5.9E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	8.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	1.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.09
	Aroclor 1260	1.6E+00	mg/kg	2.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	5.7E-05	mg/kg-day	4.0E-04	mg/kg-day	0.1
	Arsenic	2.3E+01	mg/kg	2.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.07
	Chromium (Total)	5.1E+03	mg/kg	7.5E-03	mg/kg-day	1.5E+00	mg/kg-day	0.005
	Chromium (Hexavalent)	4.5E+01	mg/kg	6.6E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	4.3E+03	mg/kg	6.4E-03	mg/kg-day	3.0E-04	mg/kg-day	21
	Copper	6.2E+02	mg/kg	9.2E-04	mg/kg-day	4.0E-02	mg/kg-day	0.02
	Iron	5.0E+04	mg/kg	7.3E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Nickel	5.4E+03	mg/kg	7.9E-03	mg/kg-day	2.0E-02	mg/kg-day	0.4
	Thallium	6.6E+00	mg/kg	9.7E-06	mg/kg-day	1.0E-05	mg/kg-day	1
	Mercury	9.2E+00	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	5.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.07
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								23
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	5.6E+00	mg/kg	3.7E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	1.3E+00	mg/kg	8.5E-07	mg/kg-day	2.0E-05	mg/kg-day	0.04
	Aroclor 1260	1.6E+00	mg/kg	1.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Antimony	3.9E+01	mg/kg	1.8E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	2.3E+01	mg/kg	3.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Chromium (Total)	5.1E+03	mg/kg	2.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Chromium (Hexavalent)	4.5E+01	mg/kg	2.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.03
	Cobalt	4.3E+03	mg/kg	2.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	6.2E+02	mg/kg	2.9E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0007
	Iron	5.0E+04	mg/kg	2.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
	Nickel	5.4E+03	mg/kg	2.5E-04	mg/kg-day	8.0E-04	mg/kg-day	0.3
	Thallium	6.6E+00	mg/kg	3.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Mercury	9.2E+00	mg/kg	4.3E-07	mg/kg-day	2.1E-05	mg/kg-day	0.021
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	4.9E-12	mg/kg-day	7.0E-10	mg/kg-day	0.007
	Bismuth-212	1.2E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	9.8E-01	pCi/g	--	--	NV	--	NV
	Lead-214	7.3E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.5E+01	pCi/g	--	--	NV	--	NV
	Radium-226	9.9E-01	pCi/g	--	--	NV	--	NV
	Radium-228	9.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	3.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								1.2
Inhalation	Aroclor 1248	2.3E-05	mg/m^3	3.9E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	4.0E-06	mg/m^3	6.7E-07	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	3.2E-06	mg/m^3	5.4E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Total)	4.6E-05	mg/m^3	7.6E-06	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	4.0E-07	mg/m^3	6.6E-08	mg/m^3	1.0E-04	mg/m^3	0.0007
	Cobalt	3.9E-05	mg/m^3	6.5E-06	mg/m^3	6.0E-06	mg/m^3	1
	Nickel	4.8E-05	mg/m^3	8.0E-06	mg/m^3	9.0E-05	mg/m^3	0.1
	Mercury	4.6E-03	mg/m^3	7.7E-04	mg/m^3	3.0E-04	mg/m^3	3
Inhalation Absorption Route Total								4
						Total of Receptor Hazards Across All Media		28

Table 7.44
Devent CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Conc (mg/L)	t* (hours)	tevent (hours)	Kp (cm/hour)	tau	B	FA	Devent (mg/cm2-event)
2,3,7,8-TCDD TEQ	1.73125E-08	29.50	2	8.08E-01	6.70	5.57	0.5	7.08E-11
2,3,7,8-TCDD TEQ (Utility Worker)	1.73125E-08	29.50	4	8.08E-01	6.70	5.57	0.5	1.00E-10

Notes:
Values obtained from November 2017 RSL parameter table.

Table 7.45

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Chromium (Hexavalent)	1.4E-02	mg/L	4.9E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
				Iron	1.1E+01	mg/L	4.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.006
				Thallium	2.2E-03	mg/L	8.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.1
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	6.3E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.1
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0003
				Chromium (Hexavalent)	1.4E-02	mg/L	4.6E-07	mg/kg-day	7.5E-05	mg/kg-day	0.006
				Iron	1.1E+01	mg/L	1.9E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0003
				Thallium	2.2E-03	mg/L	3.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	6.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.9
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.9
	Exposure Medium Total										1

Table 7.46

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC Value	EPC Units	Non-cancer Risk Calculations: Intake Value	Intake Units	RfD Value	RfD Units	Hazard Quotient
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
				Chromium (Hexavalent)	1.4E-02	mg/L	1.3E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0004
				Iron	1.1E+01	mg/L	1.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.002
				Thallium	2.2E-03	mg/L	2.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.7E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.03
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0004
				Chromium (Hexavalent)	1.4E-02	mg/L	5.5E-07	mg/kg-day	7.5E-05	mg/kg-day	0.01
				Iron	1.1E+01	mg/L	2.3E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0003
				Thallium	2.2E-03	mg/L	4.5E-08	mg/kg-day	1.0E-05	mg/kg-day	0.00
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	7.2E-10	mg/kg-day	7.0E-10	mg/kg-day	1
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								1
	Exposure Medium Total										1

Table 7.47

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	4.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-02	mg/L	9.2E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0003
				Iron	1.1E+01	mg/L	7.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
				Thallium	2.2E-03	mg/L	1.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.2E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.02
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	4.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
				Chromium (Hexavalent)	1.4E-02	mg/L	2.2E-07	mg/kg-day	7.5E-05	mg/kg-day	0.0029
				Iron	1.1E+01	mg/L	9.2E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	2.2E-03	mg/L	1.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	2.9E-10	mg/kg-day	7.0E-10	mg/kg-day	0.4
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.4
	Exposure Medium Total										0.4

Table 7.48

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-02	mg/L	8.0E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0003
				Iron	1.1E+01	mg/L	6.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
				Thallium	2.2E-03	mg/L	1.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.0E-12	mg/kg-day	7.0E-10	mg/kg-day	0.001
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.02
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
				Chromium (Hexavalent)	1.4E-02	mg/L	1.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.0150
				Iron	1.1E+01	mg/L	4.7E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0007
				Thallium	2.2E-03	mg/L	9.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.009
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.0E-09	mg/kg-day	7.0E-10	mg/kg-day	1.5
				Radium-226	2.5E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								1.5
	Exposure Medium Total										1.5

Table 7.49
Devent CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Conc (mg/L)	t* (hours)	tevent (hours)	Kp (cm/hour)	tau	B	FA	Devent (mg/cm2-event)
2,3,7,8-TCDD TEQ	8.13637E-10	29.47	2	8.08E-01	6.68	5.58	0.5	3.32E-12
2,3,7,8-TCDD TEQ (Utility Worker)	8.13637E-10	29.47	4	8.08E-01	6.68	5.58	0.5	4.70E-12
High risk PCBs	2.24E-06	19.45	2	5.45E-01	4.54	3.58	0.5	5.08E-09
High risk PCBs (Utility Worker)	2.24E-06	19.45	4	5.45E-01	4.54	3.58	0.5	7.18E-09

Notes:
Values obtained from RAGS Part E, Chapter 3 (metals) and Appendix B (organic compounds), or November 2017 RSL parameter table.
Values for PCB 156 used for dioxin-like PCBs

Table 7.50

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Chromium (Hexavalent)	2.6E-03	mg/L	9.4E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0003
				Iron	7.7E-01	mg/L	2.8E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0004
				Thallium	3.4E-03	mg/L	1.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
				High Risk PCBs	2.2E-06	mg/L	8.1E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.9E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0004
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.1
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	9.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
				Chromium (Hexavalent)	2.6E-03	mg/L	8.9E-08	mg/kg-day	7.5E-05	mg/kg-day	0.001
				Iron	7.7E-01	mg/L	1.3E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00002
				Thallium	3.4E-03	mg/L	5.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.006
				High Risk PCBs	2.2E-06	mg/L	4.4E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.05
	Exposure Medium Total										0.2

Table 7.51

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	5.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
				Chromium (Hexavalent)	2.6E-03	mg/L	2.6E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
				Iron	7.7E-01	mg/L	7.6E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	3.4E-03	mg/L	3.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
				High Risk PCBs	2.2E-06	mg/L	2.2E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	8.1E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.04
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0004
				Chromium (Hexavalent)	2.6E-03	mg/L	1.1E-07	mg/kg-day	7.5E-05	mg/kg-day	0.001
				Iron	7.7E-01	mg/L	1.6E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00002
				Thallium	3.4E-03	mg/L	6.8E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
				High Risk PCBs	2.2E-06	mg/L	5.2E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	3.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.05
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.06
	Exposure Medium Total										0.1

Table 7.52

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	3.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	2.6E-03	mg/L	1.8E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
				Iron	7.7E-01	mg/L	5.2E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	3.4E-03	mg/L	2.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				High Risk PCBs	2.2E-06	mg/L	1.5E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	5.5E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.02
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	4.7E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
				Chromium (Hexavalent)	2.6E-03	mg/L	4.2E-08	mg/kg-day	7.5E-05	mg/kg-day	0.0006
				Iron	7.7E-01	mg/L	6.3E-06	mg/kg-day	7.0E-01	mg/kg-day	0.00001
				Thallium	3.4E-03	mg/L	2.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.003
				High Risk PCBs	2.2E-06	mg/L	2.1E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.02
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.02
	Exposure Medium Total										0.05

Table 7.53

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	3.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Chromium (Hexavalent)	2.6E-03	mg/L	1.4E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0005
				Iron	7.7E-01	mg/L	4.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0006
				Thallium	3.4E-03	mg/L	1.8E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
				High Risk PCBs	2.2E-06	mg/L	1.2E-09	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.5E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0006
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.2
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0005
				Chromium (Hexavalent)	2.6E-03	mg/L	1.3E-07	mg/kg-day	7.5E-05	mg/kg-day	0.002
				Iron	7.7E-01	mg/L	2.0E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00003
				Thallium	3.4E-03	mg/L	8.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.009
				High Risk PCBs	2.2E-06	mg/L	6.6E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.3E-11	mg/kg-day	7.0E-10	mg/kg-day	0.06
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.07
	Exposure Medium Total										0.3

Table 7.54

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	8.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
				Chromium (Hexavalent)	2.6E-03	mg/L	3.9E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
				Iron	7.7E-01	mg/L	1.2E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0002
				Thallium	3.4E-03	mg/L	5.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.05
				High Risk PCBs	2.2E-06	mg/L	3.4E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.2E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0002
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.05
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0006
				Chromium (Hexavalent)	2.6E-03	mg/L	1.6E-07	mg/kg-day	7.5E-05	mg/kg-day	0.002
				Iron	7.7E-01	mg/L	2.4E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00003
				Thallium	3.4E-03	mg/L	1.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
				High Risk PCBs	2.2E-06	mg/L	7.8E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	5.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.07
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.09
	Exposure Medium Total										0.1

Table 7.55

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
				Chromium (Hexavalent)	2.6E-03	mg/L	2.7E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
				Iron	7.7E-01	mg/L	7.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	3.4E-03	mg/L	3.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
				High Risk PCBs	2.2E-06	mg/L	2.3E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	8.4E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.04
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	7.1E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
				Chromium (Hexavalent)	2.6E-03	mg/L	6.4E-08	mg/kg-day	7.5E-05	mg/kg-day	0.0009
				Iron	7.7E-01	mg/L	9.5E-06	mg/kg-day	7.0E-01	mg/kg-day	0.00001
				Thallium	3.4E-03	mg/L	4.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
				High Risk PCBs	2.2E-06	mg/L	3.1E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.1E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.03
	Exposure Medium Total										0.07

Table 7.56

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	3.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	2.6E-03	mg/L	1.5E-07	mg/kg-day	3.0E-03	mg/kg-day	0.0001
				Iron	7.7E-01	mg/L	4.5E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	3.4E-03	mg/L	2.0E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				High Risk PCBs	2.2E-06	mg/L	1.3E-10	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.8E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.02
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	2.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
				Chromium (Hexavalent)	2.6E-03	mg/L	2.2E-07	mg/kg-day	7.5E-05	mg/kg-day	0.0029
				Iron	7.7E-01	mg/L	3.2E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00005
				Thallium	3.4E-03	mg/L	1.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.014
				High Risk PCBs	2.2E-06	mg/L	7.5E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.07
				Potassium-40	1.7E+02	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.09
	Exposure Medium Total										0.11

Table 7.57
Devent CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Conc (mg/L)	t* (hours)	tevent (hours)	Kp (cm/hour)	tau	B	FA	Devent (mg/cm2-event)
Dioxin-like PCBs	4.82928E-09	50.31	2	1.66E+00	11.04	12.13	0.5	5.21E-11
Dioxin-like PCBs (Utility Worker)	4.82928E-09	50.31	4	1.66E+00	11.04	12.13	0.5	7.36E-11
2,3,7,8-TCDD TEQ	1.20042E-09	29.47	2	8.08E-01	6.68	5.58	0.5	4.90E-12
2,3,7,8-TCDD TEQ (Utility Worker)	1.20042E-09	29.47	4	8.08E-01	6.68	5.58	0.5	6.93E-12
High risk PCBs	2.35E-04	19.45	2	5.45E-01	4.54	3.58	0.5	5.34E-07
High risk PCBs (Utility Worker)	2.35E-04	19.45	4	5.45E-01	4.54	3.58	0.5	7.56E-07

Notes:
Values obtained from RAGS Part E, Chapter 3 (metals) and Appendix B (organic compounds), or November 2017 RSL parameter table.
Values for PCB 156 used for dioxin-like PCBs

Table 7.58

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Chromium (Hexavalent)	1.4E-01	mg/L	4.9E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
				Cobalt	2.6E-01	mg/L	9.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
				Iron	9.3E-01	mg/L	3.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0005
				Thallium	2.3E-03	mg/L	8.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.1
				Cyanide	3.6E-03	mg/L	1.3E-06	mg/kg-day	6.0E-04	mg/kg-day	0.002
				Dioxin-Like PCBs	4.8E-09	mg/L	1.7E-12	mg/kg-day	7.0E-10	mg/kg-day	0.002
				High Risk PCBs	2.4E-04	mg/L	8.5E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	4.3E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.4
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	1.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0003
				Chromium (Hexavalent)	1.4E-01	mg/L	4.7E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
				Cobalt	2.6E-01	mg/L	1.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
				Iron	9.3E-01	mg/L	1.6E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00002
				Thallium	2.3E-03	mg/L	3.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
				Cyanide	3.6E-03	mg/L	6.2E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0001
				Dioxin-Like PCBs	4.8E-09	mg/L	4.5E-10	mg/kg-day	7.0E-10	mg/kg-day	0.6
				High Risk PCBs	2.4E-04	mg/L	4.6E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	4.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.8
	Exposure Medium Total										1

Table 7.59

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	5.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
				Chromium (Hexavalent)	1.4E-01	mg/L	1.4E-05	mg/kg-day	3.0E-03	mg/kg-day	0.005
				Cobalt	2.6E-01	mg/L	2.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
				Iron	9.3E-01	mg/L	9.3E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	2.3E-03	mg/L	2.3E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				Cyanide	3.6E-03	mg/L	3.6E-07	mg/kg-day	6.0E-04	mg/kg-day	0.001
				Dioxin-Like PCBs	4.8E-09	mg/L	4.8E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
				High Risk PCBs	2.4E-04	mg/L	2.3E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	1.2E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0002
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.1
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	1.2E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0004
				Chromium (Hexavalent)	1.4E-01	mg/L	5.5E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
				Cobalt	2.6E-01	mg/L	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Iron	9.3E-01	mg/L	1.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00003
				Thallium	2.3E-03	mg/L	4.7E-08	mg/kg-day	1.0E-05	mg/kg-day	0.005
				Cyanide	3.6E-03	mg/L	7.3E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0001
				Dioxin-Like PCBs	4.8E-09	mg/L	5.3E-10	mg/kg-day	7.0E-10	mg/kg-day	0.8
				High Risk PCBs	2.4E-04	mg/L	5.4E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	5.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.9
	Exposure Medium Total										1

Table 7.60

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Current/Future Trespasser/Visitor and Future Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	4.0E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-01	mg/L	9.2E-06	mg/kg-day	3.0E-03	mg/kg-day	0.003
				Cobalt	2.6E-01	mg/L	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
				Iron	9.3E-01	mg/L	6.3E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	2.3E-03	mg/L	1.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				Cyanide	3.6E-03	mg/L	2.4E-07	mg/kg-day	6.0E-04	mg/kg-day	0.0004
				Dioxin-Like PCBs	4.8E-09	mg/L	3.3E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0005
				High Risk PCBs	2.4E-04	mg/L	1.6E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	8.1E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.08
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	4.8E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
				Chromium (Hexavalent)	1.4E-01	mg/L	2.2E-06	mg/kg-day	7.5E-05	mg/kg-day	0.03
				Cobalt	2.6E-01	mg/L	8.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
				Iron	9.3E-01	mg/L	7.6E-06	mg/kg-day	7.0E-01	mg/kg-day	0.00001
				Thallium	2.3E-03	mg/L	1.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.002
				Cyanide	3.6E-03	mg/L	2.9E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00005
				Dioxin-Like PCBs	4.8E-09	mg/L	2.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
				High Risk PCBs	2.4E-04	mg/L	2.2E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	2.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.03
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.4
	Exposure Medium Total										0.4

Table 7.61

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Chromium (Hexavalent)	1.4E-01	mg/L	7.5E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
				Cobalt	2.6E-01	mg/L	1.4E-04	mg/kg-day	3.0E-04	mg/kg-day	0.5
				Iron	9.3E-01	mg/L	5.1E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
				Thallium	2.3E-03	mg/L	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
				Cyanide	3.6E-03	mg/L	2.0E-06	mg/kg-day	6.0E-04	mg/kg-day	0.003
				Dioxin-Like PCBs	4.8E-09	mg/L	2.6E-12	mg/kg-day	7.0E-10	mg/kg-day	0.004
				High Risk PCBs	2.4E-04	mg/L	1.3E-07	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	6.6E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.6
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	1.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-01	mg/L	7.1E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
				Cobalt	2.6E-01	mg/L	2.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
				Iron	9.3E-01	mg/L	2.4E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00003
				Thallium	2.3E-03	mg/L	6.0E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
				Cyanide	3.6E-03	mg/L	9.4E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0002
				Dioxin-Like PCBs	4.8E-09	mg/L	6.8E-10	mg/kg-day	7.0E-10	mg/kg-day	1
				High Risk PCBs	2.4E-04	mg/L	6.9E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	6.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								1
	Exposure Medium Total										2

Table 7.62

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	8.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
				Chromium (Hexavalent)	1.4E-01	mg/L	2.1E-05	mg/kg-day	3.0E-03	mg/kg-day	0.01
				Cobalt	2.6E-01	mg/L	3.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
				Iron	9.3E-01	mg/L	1.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.0002
				Thallium	2.3E-03	mg/L	3.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
				Cyanide	3.6E-03	mg/L	5.4E-07	mg/kg-day	6.0E-04	mg/kg-day	0.001
				Dioxin-Like PCBs	4.8E-09	mg/L	7.3E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
				High Risk PCBs	2.4E-04	mg/L	3.6E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	1.8E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0003
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.2
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	1.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-01	mg/L	8.4E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
				Cobalt	2.6E-01	mg/L	3.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
				Iron	9.3E-01	mg/L	2.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00004
				Thallium	2.3E-03	mg/L	7.1E-08	mg/kg-day	1.0E-05	mg/kg-day	0.01
				Cyanide	3.6E-03	mg/L	1.1E-07	mg/kg-day	6.0E-04	mg/kg-day	0.0002
				Dioxin-Like PCBs	4.8E-09	mg/L	8.0E-10	mg/kg-day	7.0E-10	mg/kg-day	1
				High Risk PCBs	2.4E-04	mg/L	8.2E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	7.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								1
	Exposure Medium Total										2

Table 7.63

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman and Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	6.1E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
				Chromium (Hexavalent)	1.4E-01	mg/L	1.4E-05	mg/kg-day	3.0E-03	mg/kg-day	0.005
				Cobalt	2.6E-01	mg/L	2.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
				Iron	9.3E-01	mg/L	9.5E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	2.3E-03	mg/L	2.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
				Cyanide	3.6E-03	mg/L	3.7E-07	mg/kg-day	6.0E-04	mg/kg-day	0.001
				Dioxin-Like PCBs	4.8E-09	mg/L	5.0E-13	mg/kg-day	7.0E-10	mg/kg-day	0.001
				High Risk PCBs	2.4E-04	mg/L	2.4E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	1.2E-13	mg/kg-day	7.0E-10	mg/kg-day	0.0002
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.1
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	7.3E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0002
				Chromium (Hexavalent)	1.4E-01	mg/L	3.4E-06	mg/kg-day	7.5E-05	mg/kg-day	0.04
				Cobalt	2.6E-01	mg/L	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
				Iron	9.3E-01	mg/L	1.2E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00002
				Thallium	2.3E-03	mg/L	2.9E-08	mg/kg-day	1.0E-05	mg/kg-day	0.003
				Cyanide	3.6E-03	mg/L	4.5E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00007
				Dioxin-Like PCBs	4.8E-09	mg/L	3.2E-10	mg/kg-day	7.0E-10	mg/kg-day	0.5
				High Risk PCBs	2.4E-04	mg/L	3.3E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	3.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.6
	Exposure Medium Total										0.7

Table 7.64

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Non-cancer Risk Calculations				
					Value	Units	Intake		RfD		Hazard Quotient
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	3.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
				Chromium (Hexavalent)	1.4E-01	mg/L	8.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.003
				Cobalt	2.6E-01	mg/L	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
				Iron	9.3E-01	mg/L	5.5E-05	mg/kg-day	7.0E-01	mg/kg-day	0.0001
				Thallium	2.3E-03	mg/L	1.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
				Cyanide	3.6E-03	mg/L	2.1E-07	mg/kg-day	6.0E-04	mg/kg-day	0.000
				Dioxin-Like PCBs	4.8E-09	mg/L	2.8E-13	mg/kg-day	7.0E-10	mg/kg-day	0.000
				High Risk PCBs	2.4E-04	mg/L	1.4E-08	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	7.1E-14	mg/kg-day	7.0E-10	mg/kg-day	0.0001
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								0.1
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	2.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0008
				Chromium (Hexavalent)	1.4E-01	mg/L	1.1E-05	mg/kg-day	7.5E-05	mg/kg-day	0.15
				Cobalt	2.6E-01	mg/L	4.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.014
				Iron	9.3E-01	mg/L	3.9E-05	mg/kg-day	7.0E-01	mg/kg-day	0.00006
				Thallium	2.3E-03	mg/L	9.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.010
				Cyanide	3.6E-03	mg/L	1.5E-07	mg/kg-day	6.0E-04	mg/kg-day	0.00025
				Dioxin-Like PCBs	4.8E-09	mg/L	7.7E-10	mg/kg-day	7.0E-10	mg/kg-day	1.1
				High Risk PCBs	2.4E-04	mg/L	7.9E-06	mg/kg-day	NV	mg/kg-day	NV
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	7.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.10
				Radium-226	5.1E+01	pCi/L	--	--	NV	--	NV
			Exp. Route Total								1.4
	Exposure Medium Total										1.4

TABLE 7.65
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	3.7E-09	mg/kg-day	1.0E-02	mg/kg-day	0.0000004
	Chlorobenzene	3.4E+01	mg/kg	2.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	1,4-Dichlorobenzene	9.7E-01	mg/kg	7.5E-07	mg/kg-day	7.0E-02	mg/kg-day	0.00001
	Benzo(a)anthracene	9.4E-01	mg/kg	7.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	6.5E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	6.3E-01	mg/kg	4.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	3.8E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	1.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	4.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	1.8E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00004
	4,4'-DDT	3.5E-03	mg/kg	2.7E-09	mg/kg-day	5.0E-04	mg/kg-day	0.00001
	Heptachlor epoxide	9.1E-03	mg/kg	7.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0005
	Aroclor 1248	8.7E+01	mg/kg	6.7E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	4.5E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	Aroclor 1260	2.7E+01	mg/kg	2.1E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	5.6E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	2.5E-02	mg/kg-day	1.0E+00	mg/kg-day	0.02
	Antimony	2.7E+01	mg/kg	2.1E-05	mg/kg-day	4.0E-04	mg/kg-day	0.05
	Arsenic	1.4E+01	mg/kg	6.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Barium	3.4E+02	mg/kg	2.6E-04	mg/kg-day	2.0E-01	mg/kg-day	0.001
	Beryllium	1.8E+00	mg/kg	1.4E-06	mg/kg-day	2.0E-03	mg/kg-day	0.001
	Cadmium	2.0E+01	mg/kg	1.5E-05	mg/kg-day	1.0E-03	mg/kg-day	0.02
	Chromium (Total)	2.2E+03	mg/kg	1.7E-03	mg/kg-day	1.5E+00	mg/kg-day	0.001
	Chromium (Hexavalent)	4.9E+00	mg/kg	3.8E-06	mg/kg-day	3.0E-03	mg/kg-day	0.001
	Cobalt	1.7E+02	mg/kg	1.3E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Copper	4.9E+03	mg/kg	3.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.09
	Cyanide	3.8E-01	mg/kg	2.9E-07	mg/kg-day	6.0E-04	mg/kg-day	0.0005
	Iron	7.4E+04	mg/kg	5.7E-02	mg/kg-day	7.0E-01	mg/kg-day	0.08
	Manganese	4.6E+02	mg/kg	3.6E-04	mg/kg-day	2.4E-02	mg/kg-day	0.01
	Nickel	5.7E+02	mg/kg	4.4E-04	mg/kg-day	2.0E-02	mg/kg-day	0.02
	Selenium	3.6E+00	mg/kg	2.8E-06	mg/kg-day	5.0E-03	mg/kg-day	0.001
	Silver	4.3E+00	mg/kg	3.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.001
	Thallium	4.2E+00	mg/kg	3.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.3
	Vanadium	9.9E+01	mg/kg	7.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.02
	Zinc	5.1E+03	mg/kg	3.9E-03	mg/kg-day	3.0E-01	mg/kg-day	0.01
	Mercury	4.6E+00	mg/kg	3.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Dioxin-like PCBs	9.7E-04	mg/kg	7.4E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.2E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								5

TABLE 7.65
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	4.8E-10	mg/kg-day	1.0E-02	mg/kg-day	0.00000005
	Chlorobenzene	3.4E+01	mg/kg	3.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.2E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000005
	Benzo(a)anthracene	9.4E-01	mg/kg	4.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Benzo(b)fluoranthene	6.3E-01	mg/kg	2.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0001
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	9.7E-08	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	2.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	7.4E-10	mg/kg-day	5.0E-05	mg/kg-day	0.00001
	4,4'-DDT	3.5E-03	mg/kg	3.5E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
	Heptachlor epoxide	9.1E-03	mg/kg	3.0E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0002
	Aroclor 1248	8.7E+01	mg/kg	4.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	2.7E-05	mg/kg-day	2.0E-05	mg/kg-day	1
	Aroclor 1260	2.7E+01	mg/kg	1.3E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	3.3E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	1.1E-03	mg/kg-day	1.0E+00	mg/kg-day	0.001
	Antimony	2.7E+01	mg/kg	8.9E-07	mg/kg-day	6.0E-05	mg/kg-day	0.01
	Arsenic	1.4E+01	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Barium	3.4E+02	mg/kg	1.1E-05	mg/kg-day	1.4E-02	mg/kg-day	0.0008
	Beryllium	1.8E+00	mg/kg	5.9E-08	mg/kg-day	1.4E-05	mg/kg-day	0.004
	Cadmium	2.0E+01	mg/kg	6.4E-08	mg/kg-day	2.5E-05	mg/kg-day	0.003
	Chromium (Total)	2.2E+03	mg/kg	7.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.004
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.6E-07	mg/kg-day	7.5E-05	mg/kg-day	0.002
	Cobalt	1.7E+02	mg/kg	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Copper	4.9E+03	mg/kg	1.6E-04	mg/kg-day	4.0E-02	mg/kg-day	0.004
	Cyanide	3.8E-01	mg/kg	1.2E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00002
	Iron	7.4E+04	mg/kg	2.4E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
	Manganese	4.6E+02	mg/kg	1.5E-05	mg/kg-day	9.6E-04	mg/kg-day	0.02
	Nickel	5.7E+02	mg/kg	1.9E-05	mg/kg-day	8.0E-04	mg/kg-day	0.02
	Selenium	3.6E+00	mg/kg	1.2E-07	mg/kg-day	5.0E-03	mg/kg-day	0.00002
	Silver	4.3E+00	mg/kg	1.4E-07	mg/kg-day	2.0E-04	mg/kg-day	0.0007
	Thallium	4.2E+00	mg/kg	1.4E-07	mg/kg-day	1.0E-05	mg/kg-day	0.01
	Vanadium	9.9E+01	mg/kg	3.2E-06	mg/kg-day	1.3E-04	mg/kg-day	0.02
	Zinc	5.1E+03	mg/kg	1.7E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	4.6E+00	mg/kg	1.5E-07	mg/kg-day	2.1E-05	mg/kg-day	0.007
	Dioxin-like PCBs	9.7E-04	mg/kg	4.4E-10	mg/kg-day	7.0E-10	mg/kg-day	0.6
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.8E-11	mg/kg-day	7.0E-10	mg/kg-day	0.04
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								2

TABLE 7.65
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	4.3E-08	mg/m^3	2.0E-03	mg/m^3	0.00002
	Chlorobenzene	4.6E-03	mg/m^3	9.5E-04	mg/m^3	5.0E-02	mg/m^3	0.02
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	1.7E-05	mg/m^3	8.0E-01	mg/m^3	0.00002
	Benzo(a)anthracene	2.0E-07	mg/m^3	4.1E-08	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.3E-10	mg/m^3	2.0E-06	mg/m^3	0.0001
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	9.5E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	7.4E-10	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	3.4E-11	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	7.8E-11	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	3.4E-13	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	5.3E-13	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	1.4E-12	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	2.7E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	1.3E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	4.0E-06	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	2.6E-04	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	4.9E-06	mg/m^3	5.0E-03	mg/m^3	0.001
	Antimony	2.0E-08	mg/m^3	4.1E-09	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	2.1E-09	mg/m^3	1.5E-05	mg/m^3	0.0001
	Barium	2.5E-07	mg/m^3	5.1E-08	mg/m^3	5.0E-04	mg/m^3	0.0001
	Beryllium	1.3E-09	mg/m^3	2.7E-10	mg/m^3	2.0E-05	mg/m^3	0.00001
	Cadmium	1.4E-08	mg/m^3	3.0E-09	mg/m^3	1.0E-05	mg/m^3	0.0003
	Chromium (Total)	1.6E-06	mg/m^3	3.3E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	7.5E-10	mg/m^3	1.0E-04	mg/m^3	0.00001
	Cobalt	1.2E-07	mg/m^3	2.6E-08	mg/m^3	6.0E-06	mg/m^3	0.004
	Copper	3.6E-06	mg/m^3	7.4E-07	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	5.7E-11	mg/m^3	8.0E-04	mg/m^3	0.0000001
	Iron	5.4E-05	mg/m^3	1.1E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	7.0E-08	mg/m^3	5.0E-05	mg/m^3	0.001
	Nickel	4.2E-07	mg/m^3	8.7E-08	mg/m^3	9.0E-05	mg/m^3	0.001
	Selenium	2.7E-09	mg/m^3	5.5E-10	mg/m^3	2.0E-02	mg/m^3	0.00000003
	Silver	3.2E-09	mg/m^3	6.5E-10	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	6.3E-10	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	1.5E-08	mg/m^3	1.0E-04	mg/m^3	0.0001
	Zinc	3.7E-06	mg/m^3	7.7E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	1.0E-04	mg/m^3	3.0E-04	mg/m^3	0.3
	Dioxin-like PCBs	4.6E-10	mg/m^3	9.4E-11	mg/m^3	4.0E-08	mg/m^3	0.002
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	2.8E-11	mg/m^3	4.0E-08	mg/m^3	0.001
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.4
							Total of Receptor Hazards Across All Media	7

TABLE 7.66
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.1E-08	mg/kg-day	1.0E-02	mg/kg-day	0.0000011
	Chlorobenzene	3.4E+01	mg/kg	7.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.004
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.1E-06	mg/kg-day	7.0E-02	mg/kg-day	0.00003
	Benzo(a)anthracene	9.4E-01	mg/kg	2.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0005
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	5.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	5.0E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00010
	4,4'-DDT	3.5E-03	mg/kg	7.7E-09	mg/kg-day	5.0E-04	mg/kg-day	0.00002
	Heptachlor epoxide	9.1E-03	mg/kg	2.0E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0015
	Aroclor 1248	8.7E+01	mg/kg	1.9E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	1.3E-04	mg/kg-day	2.0E-05	mg/kg-day	6
	Aroclor 1260	2.7E+01	mg/kg	6.0E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	1.6E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	7.1E-02	mg/kg-day	1.0E+00	mg/kg-day	0.07
	Antimony	2.7E+01	mg/kg	6.0E-05	mg/kg-day	4.0E-04	mg/kg-day	0.15
	Arsenic	1.4E+01	mg/kg	1.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.06
	Barium	3.4E+02	mg/kg	7.4E-04	mg/kg-day	2.0E-01	mg/kg-day	0.004
	Beryllium	1.8E+00	mg/kg	3.9E-06	mg/kg-day	2.0E-03	mg/kg-day	0.002
	Cadmium	2.0E+01	mg/kg	4.3E-05	mg/kg-day	1.0E-03	mg/kg-day	0.04
	Chromium (Total)	2.2E+03	mg/kg	4.8E-03	mg/kg-day	1.5E+00	mg/kg-day	0.003
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.1E-05	mg/kg-day	3.0E-03	mg/kg-day	0.004
	Cobalt	1.7E+02	mg/kg	3.7E-04	mg/kg-day	3.0E-04	mg/kg-day	1.2
	Copper	4.9E+03	mg/kg	1.1E-02	mg/kg-day	4.0E-02	mg/kg-day	0.27
	Cyanide	3.8E-01	mg/kg	8.3E-07	mg/kg-day	6.0E-04	mg/kg-day	0.0014
	Iron	7.4E+04	mg/kg	1.6E-01	mg/kg-day	7.0E-01	mg/kg-day	0.23
	Manganese	4.6E+02	mg/kg	1.0E-03	mg/kg-day	2.4E-02	mg/kg-day	0.04
	Nickel	5.7E+02	mg/kg	1.3E-03	mg/kg-day	2.0E-02	mg/kg-day	0.06
	Selenium	3.6E+00	mg/kg	8.0E-06	mg/kg-day	5.0E-03	mg/kg-day	0.002
	Silver	4.3E+00	mg/kg	9.5E-06	mg/kg-day	5.0E-03	mg/kg-day	0.002
	Thallium	4.2E+00	mg/kg	9.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.9
	Vanadium	9.9E+01	mg/kg	2.2E-04	mg/kg-day	5.0E-03	mg/kg-day	0.04
	Zinc	5.1E+03	mg/kg	1.1E-02	mg/kg-day	3.0E-01	mg/kg-day	0.04
	Mercury	4.6E+00	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Dioxin-like PCBs	9.7E-04	mg/kg	2.1E-09	mg/kg-day	7.0E-10	mg/kg-day	3
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	6.4E-10	mg/kg-day	7.0E-10	mg/kg-day	0.9
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								14

TABLE 7.66
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	7.6E-10	mg/kg-day	1.0E-02	mg/kg-day	0.00000008
	Chlorobenzene	3.4E+01	mg/kg	5.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
	1,4-Dichlorobenzene	9.7E-01	mg/kg	5.1E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000007
	Benzo(a)anthracene	9.4E-01	mg/kg	6.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	5.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	6.3E-01	mg/kg	4.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0001
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	1.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	3.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	1.2E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00002
	4,4'-DDT	3.5E-03	mg/kg	5.5E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
	Heptachlor epoxide	9.1E-03	mg/kg	4.7E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0004
	Aroclor 1248	8.7E+01	mg/kg	6.4E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	4.2E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	Aroclor 1260	2.7E+01	mg/kg	2.0E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	5.3E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	1.7E-03	mg/kg-day	1.0E+00	mg/kg-day	0.002
	Antimony	2.7E+01	mg/kg	1.4E-06	mg/kg-day	6.0E-05	mg/kg-day	0.02
	Arsenic	1.4E+01	mg/kg	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
	Barium	3.4E+02	mg/kg	1.8E-05	mg/kg-day	1.4E-02	mg/kg-day	0.0013
	Beryllium	1.8E+00	mg/kg	9.3E-08	mg/kg-day	1.4E-05	mg/kg-day	0.007
	Cadmium	2.0E+01	mg/kg	1.0E-07	mg/kg-day	2.5E-05	mg/kg-day	0.004
	Chromium (Total)	2.2E+03	mg/kg	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.006
	Chromium (Hexavalent)	4.9E+00	mg/kg	2.6E-07	mg/kg-day	7.5E-05	mg/kg-day	0.003
	Cobalt	1.7E+02	mg/kg	8.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Copper	4.9E+03	mg/kg	2.5E-04	mg/kg-day	4.0E-02	mg/kg-day	0.006
	Cyanide	3.8E-01	mg/kg	2.0E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00003
	Iron	7.4E+04	mg/kg	3.9E-03	mg/kg-day	7.0E-01	mg/kg-day	0.006
	Manganese	4.6E+02	mg/kg	2.4E-05	mg/kg-day	9.6E-04	mg/kg-day	0.03
	Nickel	5.7E+02	mg/kg	3.0E-05	mg/kg-day	8.0E-04	mg/kg-day	0.04
	Selenium	3.6E+00	mg/kg	1.9E-07	mg/kg-day	5.0E-03	mg/kg-day	0.00004
	Silver	4.3E+00	mg/kg	2.2E-07	mg/kg-day	2.0E-04	mg/kg-day	0.0011
	Thallium	4.2E+00	mg/kg	2.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.02
	Vanadium	9.9E+01	mg/kg	5.1E-06	mg/kg-day	1.3E-04	mg/kg-day	0.04
	Zinc	5.1E+03	mg/kg	2.6E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	4.6E+00	mg/kg	2.4E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0113
	Dioxin-like PCBs	9.7E-04	mg/kg	7.0E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	4.5E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								3

TABLE 7.66
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	5.7E-09	mg/m^3	2.0E-03	mg/m^3	0.000003
	Chlorobenzene	4.6E-03	mg/m^3	1.3E-04	mg/m^3	5.0E-02	mg/m^3	0.003
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.2E-06	mg/m^3	8.0E-01	mg/m^3	0.000003
	Benzo(a)anthracene	2.0E-07	mg/m^3	5.4E-09	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.7E-11	mg/m^3	2.0E-06	mg/m^3	0.000009
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	1.3E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	9.9E-11	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	4.6E-12	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	1.0E-11	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	4.6E-14	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	7.1E-14	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	1.8E-13	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	3.6E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	1.8E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	5.3E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.5E-05	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	6.5E-07	mg/m^3	5.0E-03	mg/m^3	0.0001
	Antimony	2.0E-08	mg/m^3	5.5E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	2.8E-10	mg/m^3	1.5E-05	mg/m^3	0.00002
	Barium	2.5E-07	mg/m^3	6.8E-09	mg/m^3	5.0E-04	mg/m^3	0.00001
	Beryllium	1.3E-09	mg/m^3	3.6E-11	mg/m^3	2.0E-05	mg/m^3	0.000002
	Cadmium	1.4E-08	mg/m^3	4.0E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	1.6E-06	mg/m^3	4.4E-08	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	1.0E-10	mg/m^3	1.0E-04	mg/m^3	0.000001
	Cobalt	1.2E-07	mg/m^3	3.4E-09	mg/m^3	6.0E-06	mg/m^3	0.001
	Copper	3.6E-06	mg/m^3	9.9E-08	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	7.6E-12	mg/m^3	8.0E-04	mg/m^3	0.000000009
	Iron	5.4E-05	mg/m^3	1.5E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	9.3E-09	mg/m^3	5.0E-05	mg/m^3	0.0002
	Nickel	4.2E-07	mg/m^3	1.2E-08	mg/m^3	9.0E-05	mg/m^3	0.0001
	Selenium	2.7E-09	mg/m^3	7.3E-11	mg/m^3	2.0E-02	mg/m^3	0.000000004
	Silver	3.2E-09	mg/m^3	8.7E-11	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	8.4E-11	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	2.0E-09	mg/m^3	1.0E-04	mg/m^3	0.00002
	Zinc	3.7E-06	mg/m^3	1.0E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	1.3E-05	mg/m^3	3.0E-04	mg/m^3	0.04
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.3E-11	mg/m^3	4.0E-08	mg/m^3	0.0003
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.8E-12	mg/m^3	4.0E-08	mg/m^3	0.00009
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.05
							Total of Receptor Hazards Across All Media	17

TABLE 7.67
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.5E-09	mg/kg-day	1.0E-02	mg/kg-day	0.0000001
	Chlorobenzene	3.4E+01	mg/kg	1.0E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0005
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.9E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000004
	Benzo(a)anthracene	9.4E-01	mg/kg	2.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	2.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0009
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.9E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0001
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	6.9E-08	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.6E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	6.9E-10	mg/kg-day	5.0E-05	mg/kg-day	0.00001
	4,4'-DDT	3.5E-03	mg/kg	1.1E-09	mg/kg-day	5.0E-04	mg/kg-day	0.000002
	Heptachlor epoxide	9.1E-03	mg/kg	2.7E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0002
	Aroclor 1248	8.7E+01	mg/kg	2.6E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	1.8E-05	mg/kg-day	2.0E-05	mg/kg-day	0.9
	Aroclor 1260	2.7E+01	mg/kg	8.3E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	2.2E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	9.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.010
	Antimony	2.7E+01	mg/kg	8.2E-06	mg/kg-day	4.0E-04	mg/kg-day	0.02
	Arsenic	1.4E+01	mg/kg	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.008
	Barium	3.4E+02	mg/kg	1.0E-04	mg/kg-day	2.0E-01	mg/kg-day	0.0005
	Beryllium	1.8E+00	mg/kg	5.4E-07	mg/kg-day	2.0E-03	mg/kg-day	0.0003
	Cadmium	2.0E+01	mg/kg	5.9E-06	mg/kg-day	1.0E-03	mg/kg-day	0.01
	Chromium (Total)	2.2E+03	mg/kg	6.6E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0004
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.5E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0005
	Cobalt	1.7E+02	mg/kg	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Copper	4.9E+03	mg/kg	1.5E-03	mg/kg-day	4.0E-02	mg/kg-day	0.04
	Cyanide	3.8E-01	mg/kg	1.1E-07	mg/kg-day	6.0E-04	mg/kg-day	0.00
	Iron	7.4E+04	mg/kg	2.2E-02	mg/kg-day	7.0E-01	mg/kg-day	0.03
	Manganese	4.6E+02	mg/kg	1.4E-04	mg/kg-day	2.4E-02	mg/kg-day	0.006
	Nickel	5.7E+02	mg/kg	1.7E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Selenium	3.6E+00	mg/kg	1.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0002
	Silver	4.3E+00	mg/kg	1.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0003
	Thallium	4.2E+00	mg/kg	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Vanadium	9.9E+01	mg/kg	3.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.006
	Zinc	5.1E+03	mg/kg	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	0.005
	Mercury	4.6E+00	mg/kg	1.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Dioxin-like PCBs	9.7E-04	mg/kg	2.9E-10	mg/kg-day	7.0E-10	mg/kg-day	0.4
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.7E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								2

TABLE 7.67
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	9.0E-10	mg/kg-day	1.0E-02	mg/kg-day	0.00000009
	Chlorobenzene	3.4E+01	mg/kg	6.3E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
	1,4-Dichlorobenzene	9.7E-01	mg/kg	6.0E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000009
	Benzo(a)anthracene	9.4E-01	mg/kg	7.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	6.8E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	6.3E-01	mg/kg	5.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	3.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	1.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	4.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	1.4E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00003
	4,4'-DDT	3.5E-03	mg/kg	6.5E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
	Heptachlor epoxide	9.1E-03	mg/kg	5.6E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0004
	Aroclor 1248	8.7E+01	mg/kg	7.5E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	5.0E-05	mg/kg-day	2.0E-05	mg/kg-day	3
	Aroclor 1260	2.7E+01	mg/kg	2.4E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	6.3E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	2.0E-03	mg/kg-day	1.0E+00	mg/kg-day	0.002
	Antimony	2.7E+01	mg/kg	1.7E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	1.4E+01	mg/kg	2.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.009
	Barium	3.4E+02	mg/kg	2.1E-05	mg/kg-day	1.4E-02	mg/kg-day	0.001
	Beryllium	1.8E+00	mg/kg	1.1E-07	mg/kg-day	1.4E-05	mg/kg-day	0.008
	Cadmium	2.0E+01	mg/kg	1.2E-07	mg/kg-day	2.5E-05	mg/kg-day	0.005
	Chromium (Total)	2.2E+03	mg/kg	1.3E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Chromium (Hexavalent)	4.9E+00	mg/kg	3.0E-07	mg/kg-day	7.5E-05	mg/kg-day	0.004
	Cobalt	1.7E+02	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Copper	4.9E+03	mg/kg	3.0E-04	mg/kg-day	4.0E-02	mg/kg-day	0.008
	Cyanide	3.8E-01	mg/kg	2.3E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00004
	Iron	7.4E+04	mg/kg	4.6E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Manganese	4.6E+02	mg/kg	2.8E-05	mg/kg-day	9.6E-04	mg/kg-day	0.03
	Nickel	5.7E+02	mg/kg	3.5E-05	mg/kg-day	8.0E-04	mg/kg-day	0.04
	Selenium	3.6E+00	mg/kg	2.2E-07	mg/kg-day	5.0E-03	mg/kg-day	0.00004
	Silver	4.3E+00	mg/kg	2.7E-07	mg/kg-day	2.0E-04	mg/kg-day	0.001
	Thallium	4.2E+00	mg/kg	2.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.03
	Vanadium	9.9E+01	mg/kg	6.1E-06	mg/kg-day	1.3E-04	mg/kg-day	0.05
	Zinc	5.1E+03	mg/kg	3.1E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	4.6E+00	mg/kg	2.8E-07	mg/kg-day	2.1E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.7E-04	mg/kg	8.3E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	5.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								4

TABLE 7.67
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	5.7E-09	mg/m^3	2.0E-03	mg/m^3	0.000003
	Chlorobenzene	4.6E-03	mg/m^3	1.3E-04	mg/m^3	5.0E-02	mg/m^3	0.003
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.2E-06	mg/m^3	8.0E-01	mg/m^3	0.000003
	Benzo(a)anthracene	2.0E-07	mg/m^3	5.4E-09	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.7E-11	mg/m^3	2.0E-06	mg/m^3	0.000009
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	1.3E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	9.9E-11	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	4.6E-12	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	1.0E-11	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	4.6E-14	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	7.1E-14	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	1.8E-13	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	3.6E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	1.8E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	5.3E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.5E-05	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	6.5E-07	mg/m^3	5.0E-03	mg/m^3	0.00013
	Antimony	2.0E-08	mg/m^3	5.5E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	2.8E-10	mg/m^3	1.5E-05	mg/m^3	0.000019
	Barium	2.5E-07	mg/m^3	6.8E-09	mg/m^3	5.0E-04	mg/m^3	0.00001
	Beryllium	1.3E-09	mg/m^3	3.6E-11	mg/m^3	2.0E-05	mg/m^3	0.000002
	Cadmium	1.4E-08	mg/m^3	4.0E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	1.6E-06	mg/m^3	4.4E-08	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	1.0E-10	mg/m^3	1.0E-04	mg/m^3	0.0000010
	Cobalt	1.2E-07	mg/m^3	3.4E-09	mg/m^3	6.0E-06	mg/m^3	0.0006
	Copper	3.6E-06	mg/m^3	9.9E-08	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	7.6E-12	mg/m^3	8.0E-04	mg/m^3	0.000000009
	Iron	5.4E-05	mg/m^3	1.5E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	9.3E-09	mg/m^3	5.0E-05	mg/m^3	0.00019
	Nickel	4.2E-07	mg/m^3	1.2E-08	mg/m^3	9.0E-05	mg/m^3	0.0001
	Selenium	2.7E-09	mg/m^3	7.3E-11	mg/m^3	2.0E-02	mg/m^3	0.000000004
	Silver	3.2E-09	mg/m^3	8.7E-11	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	8.4E-11	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	2.0E-09	mg/m^3	1.0E-04	mg/m^3	0.000020
	Zinc	3.7E-06	mg/m^3	1.0E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	1.3E-05	mg/m^3	3.0E-04	mg/m^3	0.04
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.3E-11	mg/m^3	4.0E-08	mg/m^3	0.0003
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.8E-12	mg/m^3	4.0E-08	mg/m^3	0.00009
	Bismuth-212	1.0E+00	pCi/g	NV	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	NV	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	NV	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	NV	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	NV	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	NV	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	NV	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	NV	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	NV	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	NV	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	NV	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	NV	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	NV	--	NV	--	NV
Inhalation Route Total								0.05
							Total of Receptor Hazards Across All Media	6

TABLE 7.68
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.0E-09	mg/kg-day	1.0E-02	mg/kg-day	0.0000001
	Chlorobenzene	3.4E+01	mg/kg	7.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.0E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000003
	Benzo(a)anthracene	9.4E-01	mg/kg	1.9E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.7E-07	mg/kg-day	3.0E-04	mg/kg-day	0.0006
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.0E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00005
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	4.7E-08	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	4.7E-10	mg/kg-day	5.0E-05	mg/kg-day	0.00001
	4,4'-DDT	3.5E-03	mg/kg	7.3E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
	Heptachlor epoxide	9.1E-03	mg/kg	1.9E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0001
	Aroclor 1248	8.7E+01	mg/kg	1.8E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	1.2E-05	mg/kg-day	2.0E-05	mg/kg-day	0.6
	Aroclor 1260	2.7E+01	mg/kg	5.6E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	1.5E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	6.7E-03	mg/kg-day	1.0E+00	mg/kg-day	0.007
	Antimony	2.7E+01	mg/kg	5.6E-06	mg/kg-day	4.0E-04	mg/kg-day	0.01
	Arsenic	1.4E+01	mg/kg	1.7E-06	mg/kg-day	3.0E-04	mg/kg-day	0.006
	Barium	3.4E+02	mg/kg	6.9E-05	mg/kg-day	2.0E-01	mg/kg-day	0.0003
	Beryllium	1.8E+00	mg/kg	3.7E-07	mg/kg-day	2.0E-03	mg/kg-day	0.0002
	Cadmium	2.0E+01	mg/kg	4.0E-06	mg/kg-day	1.0E-03	mg/kg-day	0.004
	Chromium (Total)	2.2E+03	mg/kg	4.5E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0003
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.0E-06	mg/kg-day	3.0E-03	mg/kg-day	0.0003
	Cobalt	1.7E+02	mg/kg	3.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Copper	4.9E+03	mg/kg	1.0E-03	mg/kg-day	4.0E-02	mg/kg-day	0.03
	Cyanide	3.8E-01	mg/kg	7.7E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0001
	Iron	7.4E+04	mg/kg	1.5E-02	mg/kg-day	7.0E-01	mg/kg-day	0.02
	Manganese	4.6E+02	mg/kg	9.5E-05	mg/kg-day	2.4E-02	mg/kg-day	0.004
	Nickel	5.7E+02	mg/kg	1.2E-04	mg/kg-day	2.0E-02	mg/kg-day	0.01
	Selenium	3.6E+00	mg/kg	7.5E-07	mg/kg-day	5.0E-03	mg/kg-day	0.0001
	Silver	4.3E+00	mg/kg	8.9E-07	mg/kg-day	5.0E-03	mg/kg-day	0.0002
	Thallium	4.2E+00	mg/kg	8.6E-07	mg/kg-day	1.0E-05	mg/kg-day	0.09
	Vanadium	9.9E+01	mg/kg	2.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.004
	Zinc	5.1E+03	mg/kg	1.0E-03	mg/kg-day	3.0E-01	mg/kg-day	0.003
	Mercury	4.6E+00	mg/kg	9.4E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Dioxin-like PCBs	9.7E-04	mg/kg	2.0E-10	mg/kg-day	7.0E-10	mg/kg-day	0.3
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	6.0E-11	mg/kg-day	7.0E-10	mg/kg-day	0.09
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								1

TABLE 7.68
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.3E-10	mg/kg-day	1.0E-02	mg/kg-day	0.00000001
	Chlorobenzene	3.4E+01	mg/kg	8.8E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00004
	1,4-Dichlorobenzene	9.7E-01	mg/kg	8.5E-08	mg/kg-day	7.0E-02	mg/kg-day	0.000001
	Benzo(a)anthracene	9.4E-01	mg/kg	1.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	9.6E-08	mg/kg-day	3.0E-04	mg/kg-day	0.0003
	Benzo(b)fluoranthene	6.3E-01	mg/kg	7.1E-08	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	4.3E-07	mg/kg-day	2.0E-02	mg/kg-day	0.00002
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	2.6E-08	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	5.8E-08	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	2.0E-10	mg/kg-day	5.0E-05	mg/kg-day	0.000004
	4,4'-DDT	3.5E-03	mg/kg	9.2E-11	mg/kg-day	5.0E-04	mg/kg-day	0.0000002
	Heptachlor epoxide	9.1E-03	mg/kg	7.9E-10	mg/kg-day	1.3E-05	mg/kg-day	0.00006
	Aroclor 1248	8.7E+01	mg/kg	1.1E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	7.1E-06	mg/kg-day	2.0E-05	mg/kg-day	0.4
	Aroclor 1260	2.7E+01	mg/kg	3.3E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	8.9E-05	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	2.8E-04	mg/kg-day	1.0E+00	mg/kg-day	0.0003
	Antimony	2.7E+01	mg/kg	2.4E-07	mg/kg-day	6.0E-05	mg/kg-day	0.004
	Arsenic	1.4E+01	mg/kg	3.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.001
	Barium	3.4E+02	mg/kg	2.9E-06	mg/kg-day	1.4E-02	mg/kg-day	0.0002
	Beryllium	1.8E+00	mg/kg	1.6E-08	mg/kg-day	1.4E-05	mg/kg-day	0.001
	Cadmium	2.0E+01	mg/kg	1.7E-08	mg/kg-day	2.5E-05	mg/kg-day	0.0007
	Chromium (Total)	2.2E+03	mg/kg	1.9E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	Chromium (Hexavalent)	4.9E+00	mg/kg	4.3E-08	mg/kg-day	7.5E-05	mg/kg-day	0.001
	Cobalt	1.7E+02	mg/kg	1.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.005
	Copper	4.9E+03	mg/kg	4.3E-05	mg/kg-day	4.0E-02	mg/kg-day	0.0011
	Cyanide	3.8E-01	mg/kg	3.3E-09	mg/kg-day	6.0E-04	mg/kg-day	0.00001
	Iron	7.4E+04	mg/kg	6.4E-04	mg/kg-day	7.0E-01	mg/kg-day	0.001
	Manganese	4.6E+02	mg/kg	4.0E-06	mg/kg-day	9.6E-04	mg/kg-day	0.004
	Nickel	5.7E+02	mg/kg	5.0E-06	mg/kg-day	8.0E-04	mg/kg-day	0.01
	Selenium	3.6E+00	mg/kg	3.1E-08	mg/kg-day	5.0E-03	mg/kg-day	0.000006
	Silver	4.3E+00	mg/kg	3.8E-08	mg/kg-day	2.0E-04	mg/kg-day	0.0002
	Thallium	4.2E+00	mg/kg	3.6E-08	mg/kg-day	1.0E-05	mg/kg-day	0.004
	Vanadium	9.9E+01	mg/kg	8.6E-07	mg/kg-day	1.3E-04	mg/kg-day	0.007
	Zinc	5.1E+03	mg/kg	4.4E-05	mg/kg-day	3.0E-01	mg/kg-day	0.0001
	Mercury	4.6E+00	mg/kg	4.0E-08	mg/kg-day	2.1E-05	mg/kg-day	0.002
	Dioxin-like PCBs	9.7E-04	mg/kg	1.2E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	7.5E-12	mg/kg-day	7.0E-10	mg/kg-day	0.01
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.6

TABLE 7.68
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	5.7E-09	mg/m^3	2.0E-03	mg/m^3	0.00
	Chlorobenzene	4.6E-03	mg/m^3	1.3E-04	mg/m^3	5.0E-02	mg/m^3	0.00
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.2E-06	mg/m^3	8.0E-01	mg/m^3	0.000003
	Benzo(a)anthracene	2.0E-07	mg/m^3	5.4E-09	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.7E-11	mg/m^3	2.0E-06	mg/m^3	0.000009
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	1.3E-11	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	9.9E-11	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	4.6E-12	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	1.0E-11	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	4.6E-14	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	7.1E-14	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	1.8E-13	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	3.6E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	1.8E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	5.3E-07	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.5E-05	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	6.5E-07	mg/m^3	5.0E-03	mg/m^3	0.00013
	Antimony	2.0E-08	mg/m^3	5.5E-10	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	2.8E-10	mg/m^3	1.5E-05	mg/m^3	0.000019
	Barium	2.5E-07	mg/m^3	6.8E-09	mg/m^3	5.0E-04	mg/m^3	0.000014
	Beryllium	1.3E-09	mg/m^3	3.6E-11	mg/m^3	2.0E-05	mg/m^3	0.0000018
	Cadmium	1.4E-08	mg/m^3	4.0E-10	mg/m^3	1.0E-05	mg/m^3	0.00004
	Chromium (Total)	1.6E-06	mg/m^3	4.4E-08	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	1.0E-10	mg/m^3	1.0E-04	mg/m^3	0.0000010
	Cobalt	1.2E-07	mg/m^3	3.4E-09	mg/m^3	6.0E-06	mg/m^3	0.0006
	Copper	3.6E-06	mg/m^3	9.9E-08	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	7.6E-12	mg/m^3	8.0E-04	mg/m^3	0.000000009
	Iron	5.4E-05	mg/m^3	1.5E-06	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	9.3E-09	mg/m^3	5.0E-05	mg/m^3	0.00019
	Nickel	4.2E-07	mg/m^3	1.2E-08	mg/m^3	9.0E-05	mg/m^3	0.00
	Selenium	2.7E-09	mg/m^3	7.3E-11	mg/m^3	2.0E-02	mg/m^3	0.000000004
	Silver	3.2E-09	mg/m^3	8.7E-11	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	8.4E-11	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	2.0E-09	mg/m^3	1.0E-04	mg/m^3	0.000020
	Zinc	3.7E-06	mg/m^3	1.0E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	1.3E-05	mg/m^3	3.0E-04	mg/m^3	0.04
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.3E-11	mg/m^3	4.0E-08	mg/m^3	0.0003
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.8E-12	mg/m^3	4.0E-08	mg/m^3	0.00009
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.05
							Total of Receptor Hazards Across All Media	2

TABLE 7.69
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.4E-08	mg/kg-day	1.0E-02	mg/kg-day	0.0000014
	Chlorobenzene	3.4E+01	mg/kg	1.0E-04	mg/kg-day	2.0E-02	mg/kg-day	0.0050
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.9E-06	mg/kg-day	7.0E-02	mg/kg-day	0.000041
	Benzo(a)anthracene	9.4E-01	mg/kg	2.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0083
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.9E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	0.00072
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	6.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	6.7E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00013
	4,4'-DDT	3.5E-03	mg/kg	1.0E-08	mg/kg-day	5.0E-04	mg/kg-day	0.000021
	Heptachlor epoxide	9.1E-03	mg/kg	2.7E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0021
	Aroclor 1248	8.7E+01	mg/kg	2.6E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	1.7E-04	mg/kg-day	2.0E-05	mg/kg-day	8.6
	Aroclor 1260	2.7E+01	mg/kg	8.1E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	2.1E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	9.5E-02	mg/kg-day	1.0E+00	mg/kg-day	0.095
	Antimony	2.7E+01	mg/kg	8.0E-05	mg/kg-day	4.0E-04	mg/kg-day	0.20
	Arsenic	1.4E+01	mg/kg	2.4E-05	mg/kg-day	3.0E-04	mg/kg-day	0.081
	Barium	3.4E+02	mg/kg	1.0E-03	mg/kg-day	2.0E-01	mg/kg-day	0.0050
	Beryllium	1.8E+00	mg/kg	5.3E-06	mg/kg-day	2.0E-03	mg/kg-day	0.0026
	Cadmium	2.0E+01	mg/kg	5.8E-05	mg/kg-day	1.0E-03	mg/kg-day	0.058
	Chromium (Total)	2.2E+03	mg/kg	6.4E-03	mg/kg-day	1.5E+00	mg/kg-day	0.0043
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.5E-05	mg/kg-day	3.0E-03	mg/kg-day	0.0049
	Cobalt	1.7E+02	mg/kg	5.0E-04	mg/kg-day	3.0E-04	mg/kg-day	1.7
	Copper	4.9E+03	mg/kg	1.4E-02	mg/kg-day	4.0E-02	mg/kg-day	0.36
	Cyanide	3.8E-01	mg/kg	1.1E-06	mg/kg-day	6.0E-04	mg/kg-day	0.0019
	Iron	7.4E+04	mg/kg	2.2E-01	mg/kg-day	7.0E-01	mg/kg-day	0.31
	Manganese	4.6E+02	mg/kg	1.4E-03	mg/kg-day	2.4E-02	mg/kg-day	0.057
	Nickel	5.7E+02	mg/kg	1.7E-03	mg/kg-day	2.0E-02	mg/kg-day	0.08
	Selenium	3.6E+00	mg/kg	1.1E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0021
	Silver	4.3E+00	mg/kg	1.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.0025
	Thallium	4.2E+00	mg/kg	1.2E-05	mg/kg-day	1.0E-05	mg/kg-day	1.2
	Vanadium	9.9E+01	mg/kg	2.9E-04	mg/kg-day	5.0E-03	mg/kg-day	0.058
	Zinc	5.1E+03	mg/kg	1.5E-02	mg/kg-day	3.0E-01	mg/kg-day	0.050
	Mercury	4.6E+00	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.045
	Dioxin-like PCBs	9.7E-04	mg/kg	2.8E-09	mg/kg-day	7.0E-10	mg/kg-day	4.1
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.5E-10	mg/kg-day	7.0E-10	mg/kg-day	1.2
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	pCi/g	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	pCi/g	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	pCi/g	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								18

TABLE 7.69
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.4E-09	mg/kg-day	1.0E-02	mg/kg-day	0.00000014
	Chlorobenzene	3.4E+01	mg/kg	9.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00048
	1,4-Dichlorobenzene	9.7E-01	mg/kg	9.2E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000013
	Benzo(a)anthracene	9.4E-01	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0035
	Benzo(b)fluoranthene	6.3E-01	mg/kg	7.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	4.6E-06	mg/kg-day	2.0E-02	mg/kg-day	0.00023
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	2.8E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	6.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	2.2E-09	mg/kg-day	5.0E-05	mg/kg-day	0.000043
	4,4'-DDT	3.5E-03	mg/kg	1.0E-09	mg/kg-day	5.0E-04	mg/kg-day	0.0000020
	Heptachlor epoxide	9.1E-03	mg/kg	8.6E-09	mg/kg-day	1.3E-05	mg/kg-day	0.00066
	Aroclor 1248	8.7E+01	mg/kg	1.2E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	7.7E-05	mg/kg-day	2.0E-05	mg/kg-day	3.8
	Aroclor 1260	2.7E+01	mg/kg	3.6E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	9.6E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	3.1E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0
	Antimony	2.7E+01	mg/kg	2.6E-06	mg/kg-day	6.0E-05	mg/kg-day	0.043
	Arsenic	1.4E+01	mg/kg	3.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.013
	Barium	3.4E+02	mg/kg	3.2E-05	mg/kg-day	1.4E-02	mg/kg-day	0.0023
	Beryllium	1.8E+00	mg/kg	1.7E-07	mg/kg-day	1.4E-05	mg/kg-day	0.012
	Cadmium	2.0E+01	mg/kg	1.9E-07	mg/kg-day	2.5E-05	mg/kg-day	0.0074
	Chromium (Total)	2.2E+03	mg/kg	2.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.0
	Chromium (Hexavalent)	4.9E+00	mg/kg	4.7E-07	mg/kg-day	7.5E-05	mg/kg-day	0.0
	Cobalt	1.7E+02	mg/kg	1.6E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Copper	4.9E+03	mg/kg	4.6E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0116
	Cyanide	3.8E-01	mg/kg	3.6E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0
	Iron	7.4E+04	mg/kg	7.0E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0
	Manganese	4.6E+02	mg/kg	4.4E-05	mg/kg-day	9.6E-04	mg/kg-day	0.0
	Nickel	5.7E+02	mg/kg	5.4E-05	mg/kg-day	8.0E-04	mg/kg-day	0.07
	Selenium	3.6E+00	mg/kg	3.4E-07	mg/kg-day	5.0E-03	mg/kg-day	0.000069
	Silver	4.3E+00	mg/kg	4.1E-07	mg/kg-day	2.0E-04	mg/kg-day	0.0020
	Thallium	4.2E+00	mg/kg	3.9E-07	mg/kg-day	1.0E-05	mg/kg-day	0.0
	Vanadium	9.9E+01	mg/kg	9.3E-06	mg/kg-day	1.3E-04	mg/kg-day	0.072
	Zinc	5.1E+03	mg/kg	4.8E-04	mg/kg-day	3.0E-01	mg/kg-day	0.0016
	Mercury	4.6E+00	mg/kg	4.3E-07	mg/kg-day	2.1E-05	mg/kg-day	0.021
	Dioxin-like PCBs	9.7E-04	mg/kg	1.3E-09	mg/kg-day	7.0E-10	mg/kg-day	1.8
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.2E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	pCi/g	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	pCi/g	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	pCi/g	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	pCi/g	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	pCi/g	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	pCi/g	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	pCi/g	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	pCi/g	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	pCi/g	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	pCi/g	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	pCi/g	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	pCi/g	NV
Dermal Absorption Route Total								6.2

TABLE 7.69
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	4.9E-08	mg/m^3	2.0E-03	mg/m^3	0.00
	Chlorobenzene	4.6E-03	mg/m^3	1.1E-03	mg/m^3	5.0E-02	mg/m^3	0.02
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	1.9E-05	mg/m^3	8.0E-01	mg/m^3	0.000024
	Benzo(a)anthracene	2.0E-07	mg/m^3	4.7E-08	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.5E-10	mg/m^3	2.0E-06	mg/m^3	0.000074
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	1.1E-10	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	8.6E-10	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	4.0E-11	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	9.1E-11	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	4.0E-13	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	6.2E-13	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	1.6E-12	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	3.1E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	1.5E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	4.6E-06	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.0E-04	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	5.7E-06	mg/m^3	5.0E-03	mg/m^3	0.00113
	Antimony	2.0E-08	mg/m^3	4.8E-09	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	2.4E-09	mg/m^3	1.5E-05	mg/m^3	0.000161
	Barium	2.5E-07	mg/m^3	5.9E-08	mg/m^3	5.0E-04	mg/m^3	0.000118
	Beryllium	1.3E-09	mg/m^3	3.1E-10	mg/m^3	2.0E-05	mg/m^3	0.0000157
	Cadmium	1.4E-08	mg/m^3	3.4E-09	mg/m^3	1.0E-05	mg/m^3	0.00034
	Chromium (Total)	1.6E-06	mg/m^3	3.8E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	8.7E-10	mg/m^3	1.0E-04	mg/m^3	0.0000087
	Cobalt	1.2E-07	mg/m^3	3.0E-08	mg/m^3	6.0E-06	mg/m^3	0.0050
	Copper	3.6E-06	mg/m^3	8.6E-07	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	6.6E-11	mg/m^3	8.0E-04	mg/m^3	0.000000083
	Iron	5.4E-05	mg/m^3	1.3E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	8.1E-08	mg/m^3	5.0E-05	mg/m^3	0.00162
	Nickel	4.2E-07	mg/m^3	1.0E-07	mg/m^3	9.0E-05	mg/m^3	0.00
	Selenium	2.7E-09	mg/m^3	6.4E-10	mg/m^3	2.0E-02	mg/m^3	0.000000032
	Silver	3.2E-09	mg/m^3	7.6E-10	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	7.3E-10	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	1.7E-08	mg/m^3	1.0E-04	mg/m^3	0.000173
	Zinc	3.7E-06	mg/m^3	8.9E-07	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	1.2E-04	mg/m^3	3.0E-04	mg/m^3	0.39
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.1E-10	mg/m^3	4.0E-08	mg/m^3	0.0027
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.3E-11	mg/m^3	4.0E-08	mg/m^3	0.00082
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								0.42
							Total of Receptor Hazards Across All Media	25

TABLE 7.70
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.4E-08	mg/kg-day	1.0E-02	mg/kg-day	0.000001
	Chlorobenzene	3.4E+01	mg/kg	9.6E-05	mg/kg-day	2.0E-02	mg/kg-day	0.005
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.8E-06	mg/kg-day	7.0E-02	mg/kg-day	0.00004
	Benzo(a)anthracene	9.4E-01	mg/kg	2.7E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	2.4E-06	mg/kg-day	3.0E-04	mg/kg-day	0.008
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.4E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0007
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	6.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	6.4E-09	mg/kg-day	5.0E-05	mg/kg-day	0.0001
	4,4'-DDT	3.5E-03	mg/kg	1.0E-08	mg/kg-day	5.0E-04	mg/kg-day	0.00002
	Heptachlor epoxide	9.1E-03	mg/kg	2.6E-08	mg/kg-day	1.3E-05	mg/kg-day	0.002
	Aroclor 1248	8.7E+01	mg/kg	2.5E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	1.6E-04	mg/kg-day	2.0E-05	mg/kg-day	8
	Aroclor 1260	2.7E+01	mg/kg	7.7E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	2.1E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	9.1E-02	mg/kg-day	1.0E+00	mg/kg-day	0.09
	Antimony	2.7E+01	mg/kg	7.7E-05	mg/kg-day	4.0E-04	mg/kg-day	0.19
	Arsenic	1.4E+01	mg/kg	2.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.1
	Barium	3.4E+02	mg/kg	9.6E-04	mg/kg-day	2.0E-01	mg/kg-day	0.00
	Beryllium	1.8E+00	mg/kg	5.1E-06	mg/kg-day	2.0E-03	mg/kg-day	0.003
	Cadmium	2.0E+01	mg/kg	5.6E-05	mg/kg-day	1.0E-03	mg/kg-day	0.056
	Chromium (Total)	2.2E+03	mg/kg	6.2E-03	mg/kg-day	1.5E+00	mg/kg-day	0.0
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.4E-05	mg/kg-day	3.0E-03	mg/kg-day	0.005
	Cobalt	1.7E+02	mg/kg	4.8E-04	mg/kg-day	3.0E-04	mg/kg-day	2
	Copper	4.9E+03	mg/kg	1.4E-02	mg/kg-day	4.0E-02	mg/kg-day	0.3
	Cyanide	3.8E-01	mg/kg	1.1E-06	mg/kg-day	6.0E-04	mg/kg-day	0.002
	Iron	7.4E+04	mg/kg	2.1E-01	mg/kg-day	7.0E-01	mg/kg-day	0.3
	Manganese	4.6E+02	mg/kg	1.3E-03	mg/kg-day	2.4E-02	mg/kg-day	0.05
	Nickel	5.7E+02	mg/kg	1.6E-03	mg/kg-day	2.0E-02	mg/kg-day	0.08
	Selenium	3.6E+00	mg/kg	1.0E-05	mg/kg-day	5.0E-03	mg/kg-day	0.002
	Silver	4.3E+00	mg/kg	1.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.002
	Thallium	4.2E+00	mg/kg	1.2E-05	mg/kg-day	1.0E-05	mg/kg-day	1
	Vanadium	9.9E+01	mg/kg	2.8E-04	mg/kg-day	5.0E-03	mg/kg-day	0.06
	Zinc	5.1E+03	mg/kg	1.4E-02	mg/kg-day	3.0E-01	mg/kg-day	0.05
	Mercury	4.6E+00	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Dioxin-like PCBs	9.7E-04	mg/kg	2.7E-09	mg/kg-day	7.0E-10	mg/kg-day	4
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.2E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								17

TABLE 7.70
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.3E-09	mg/kg-day	1.0E-02	mg/kg-day	0.0000001
	Chlorobenzene	3.4E+01	mg/kg	9.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0005
	1,4-Dichlorobenzene	9.7E-01	mg/kg	8.8E-07	mg/kg-day	7.0E-02	mg/kg-day	0.00001
	Benzo(a)anthracene	9.4E-01	mg/kg	1.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	6.3E-01	mg/kg	7.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	4.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0002
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	2.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	6.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	2.1E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00004
	4,4'-DDT	3.5E-03	mg/kg	9.6E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000002
	Heptachlor epoxide	9.1E-03	mg/kg	8.3E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0006
	Aroclor 1248	8.7E+01	mg/kg	1.1E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	7.4E-05	mg/kg-day	2.0E-05	mg/kg-day	4
	Aroclor 1260	2.7E+01	mg/kg	3.5E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	9.2E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	2.9E-02	mg/kg-day	1.0E+00	mg/kg-day	0.03
	Antimony	2.7E+01	mg/kg	2.5E-06	mg/kg-day	6.0E-05	mg/kg-day	0.041
	Arsenic	1.4E+01	mg/kg	1.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.00
	Barium	3.4E+02	mg/kg	9.2E-05	mg/kg-day	1.4E-02	mg/kg-day	0.01
	Beryllium	1.8E+00	mg/kg	1.6E-07	mg/kg-day	1.4E-05	mg/kg-day	0.012
	Cadmium	2.0E+01	mg/kg	1.8E-06	mg/kg-day	2.5E-05	mg/kg-day	0.07
	Chromium (Total)	2.2E+03	mg/kg	2.0E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	Chromium (Hexavalent)	4.9E+00	mg/kg	4.5E-07	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	1.7E+02	mg/kg	1.5E-05	mg/kg-day	3.0E-04	mg/kg-day	0.051
	Copper	4.9E+03	mg/kg	4.4E-04	mg/kg-day	4.0E-02	mg/kg-day	0.0
	Cyanide	3.8E-01	mg/kg	3.4E-08	mg/kg-day	6.0E-04	mg/kg-day	0.00
	Iron	7.4E+04	mg/kg	6.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Manganese	4.6E+02	mg/kg	4.2E-05	mg/kg-day	9.6E-04	mg/kg-day	0.04
	Nickel	5.7E+02	mg/kg	5.2E-05	mg/kg-day	8.0E-04	mg/kg-day	0.06
	Selenium	3.6E+00	mg/kg	3.3E-07	mg/kg-day	5.0E-03	mg/kg-day	0.00007
	Silver	4.3E+00	mg/kg	3.9E-07	mg/kg-day	2.0E-04	mg/kg-day	0.002
	Thallium	4.2E+00	mg/kg	3.8E-07	mg/kg-day	1.0E-05	mg/kg-day	0.04
	Vanadium	9.9E+01	mg/kg	9.0E-06	mg/kg-day	1.3E-04	mg/kg-day	0.07
	Zinc	5.1E+03	mg/kg	4.6E-04	mg/kg-day	3.0E-01	mg/kg-day	0.002
	Mercury	4.6E+00	mg/kg	4.1E-07	mg/kg-day	2.1E-05	mg/kg-day	0.020
	Dioxin-like PCBs	9.7E-04	mg/kg	1.2E-09	mg/kg-day	7.0E-10	mg/kg-day	2
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	7.9E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	-	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								6

TABLE 7.70
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.0E-06	mg/m^3	4.6E-07	mg/m^3	2.0E-03	mg/m^3	0.0002
	Chlorobenzene	4.5E-02	mg/m^3	1.0E-02	mg/m^3	5.0E-02	mg/m^3	0.2
	1,4-Dichlorobenzene	7.9E-04	mg/m^3	1.8E-04	mg/m^3	8.0E-01	mg/m^3	0.0002
	Benzo(a)anthracene	2.1E-06	mg/m^3	4.9E-07	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.9E-07	mg/m^3	4.4E-08	mg/m^3	2.0E-06	mg/m^3	0.02
	Benzo(b)fluoranthene	1.4E-07	mg/m^3	3.3E-08	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.1E-06	mg/m^3	2.5E-07	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	5.2E-08	mg/m^3	1.2E-08	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	1.2E-07	mg/m^3	2.7E-08	mg/m^3	NV	mg/m^3	NV
	Dieldrin	5.2E-10	mg/m^3	1.2E-10	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	8.0E-10	mg/m^3	1.8E-10	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	2.1E-09	mg/m^3	4.7E-10	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-03	mg/m^3	2.9E-04	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-04	mg/m^3	1.5E-04	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	2.0E-04	mg/m^3	4.5E-05	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-02	mg/m^3	2.9E-03	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.3E-03	mg/m^3	1.7E-03	mg/m^3	5.0E-03	mg/m^3	0.33
	Antimony	6.2E-06	mg/m^3	1.4E-06	mg/m^3	NV	mg/m^3	NV
	Arsenic	3.1E-06	mg/m^3	7.2E-07	mg/m^3	1.5E-05	mg/m^3	0.05
	Barium	7.7E-05	mg/m^3	1.7E-05	mg/m^3	5.0E-04	mg/m^3	0.03
	Beryllium	4.1E-07	mg/m^3	9.3E-08	mg/m^3	2.0E-05	mg/m^3	0.00
	Cadmium	4.5E-06	mg/m^3	1.0E-06	mg/m^3	1.0E-05	mg/m^3	0.102
	Chromium (Total)	4.9E-04	mg/m^3	1.1E-04	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.1E-06	mg/m^3	2.6E-07	mg/m^3	1.0E-04	mg/m^3	0.0026
	Cobalt	3.8E-05	mg/m^3	8.8E-06	mg/m^3	6.0E-06	mg/m^3	1.463
	Copper	1.1E-03	mg/m^3	2.5E-04	mg/m^3	NV	mg/m^3	NV
	Cyanide	8.5E-08	mg/m^3	1.9E-08	mg/m^3	8.0E-04	mg/m^3	0.00
	Iron	1.7E-02	mg/m^3	3.8E-03	mg/m^3	NV	mg/m^3	NV
	Manganese	1.0E-04	mg/m^3	2.4E-05	mg/m^3	5.0E-05	mg/m^3	0.5
	Nickel	1.3E-04	mg/m^3	3.0E-05	mg/m^3	9.0E-05	mg/m^3	0.3
	Selenium	8.2E-07	mg/m^3	1.9E-07	mg/m^3	2.0E-02	mg/m^3	0.000009
	Silver	9.8E-07	mg/m^3	2.2E-07	mg/m^3	NV	mg/m^3	NV
	Thallium	9.4E-07	mg/m^3	2.2E-07	mg/m^3	NV	mg/m^3	NV
	Vanadium	2.2E-05	mg/m^3	5.1E-06	mg/m^3	1.0E-04	mg/m^3	0.05
	Zinc	1.2E-03	mg/m^3	2.6E-04	mg/m^3	NV	mg/m^3	NV
	Mercury	8.0E-03	mg/m^3	1.8E-03	mg/m^3	3.0E-04	mg/m^3	6
	Dioxin-like PCBs	4.7E-09	mg/m^3	1.1E-09	mg/m^3	4.0E-08	mg/m^3	NV
	2,3,7,8-TCDD TEQ	1.4E-09	mg/m^3	3.2E-10	mg/m^3	4.0E-08	mg/m^3	NV
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	-	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								9
							Total of Receptor Hazards Across All Media	33

TABLE 7.71
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	6.2E-08	mg/kg-day	1.0E-02	mg/kg-day	0.00001
	Chlorobenzene	3.4E+01	mg/kg	4.3E-04	mg/kg-day	2.0E-02	mg/kg-day	0.02
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.2E-05	mg/kg-day	7.0E-02	mg/kg-day	0.0002
	Benzo(a)anthracene	9.4E-01	mg/kg	1.2E-05	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Benzo(b)fluoranthene	6.3E-01	mg/kg	8.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	6.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.003
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	2.9E-06	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	6.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	2.9E-08	mg/kg-day	5.0E-05	mg/kg-day	0.001
	4,4'-DDT	3.5E-03	mg/kg	4.5E-08	mg/kg-day	5.0E-04	mg/kg-day	0.0001
	Heptachlor epoxide	9.1E-03	mg/kg	1.2E-07	mg/kg-day	1.3E-05	mg/kg-day	0.01
	Aroclor 1248	8.7E+01	mg/kg	1.1E-03	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	7.4E-04	mg/kg-day	2.0E-05	mg/kg-day	37
	Aroclor 1260	2.7E+01	mg/kg	3.5E-04	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	9.3E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	4.1E-01	mg/kg-day	1.0E+00	mg/kg-day	0.4
	Antimony	2.7E+01	mg/kg	3.5E-04	mg/kg-day	4.0E-04	mg/kg-day	0.9
	Arsenic	1.4E+01	mg/kg	1.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Barium	3.4E+02	mg/kg	4.3E-03	mg/kg-day	2.0E-01	mg/kg-day	0.02
	Beryllium	1.8E+00	mg/kg	2.3E-05	mg/kg-day	2.0E-03	mg/kg-day	0.01
	Cadmium	2.0E+01	mg/kg	2.5E-04	mg/kg-day	1.0E-03	mg/kg-day	0.3
	Chromium (Total)	2.2E+03	mg/kg	2.8E-02	mg/kg-day	1.5E+00	mg/kg-day	0.02
	Chromium (Hexavalent)	4.9E+00	mg/kg	6.3E-05	mg/kg-day	3.0E-03	mg/kg-day	0.02
	Cobalt	1.7E+02	mg/kg	2.2E-03	mg/kg-day	3.0E-04	mg/kg-day	7
	Copper	4.9E+03	mg/kg	6.3E-02	mg/kg-day	4.0E-02	mg/kg-day	2
	Cyanide	3.8E-01	mg/kg	4.8E-06	mg/kg-day	6.0E-04	mg/kg-day	0.01
	Iron	7.4E+04	mg/kg	9.5E-01	mg/kg-day	7.0E-01	mg/kg-day	1
	Manganese	4.6E+02	mg/kg	5.9E-03	mg/kg-day	2.4E-02	mg/kg-day	0.2
	Nickel	5.7E+02	mg/kg	7.3E-03	mg/kg-day	2.0E-02	mg/kg-day	0.4
	Selenium	3.6E+00	mg/kg	4.6E-05	mg/kg-day	5.0E-03	mg/kg-day	0.01
	Silver	4.3E+00	mg/kg	5.5E-05	mg/kg-day	5.0E-03	mg/kg-day	0.01
	Thallium	4.2E+00	mg/kg	5.3E-05	mg/kg-day	1.0E-05	mg/kg-day	5
	Vanadium	9.9E+01	mg/kg	1.3E-03	mg/kg-day	5.0E-03	mg/kg-day	0.3
	Zinc	5.1E+03	mg/kg	6.5E-02	mg/kg-day	3.0E-01	mg/kg-day	0.2
	Mercury	4.6E+00	mg/kg	5.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Dioxin-like PCBs	9.7E-04	mg/kg	1.2E-08	mg/kg-day	7.0E-10	mg/kg-day	18
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	3.7E-09	mg/kg-day	7.0E-10	mg/kg-day	5
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								79

TABLE 7.71
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	4.4E-09	mg/kg-day	1.0E-02	mg/kg-day	0.0000004
	Chlorobenzene	3.4E+01	mg/kg	3.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.0E-06	mg/kg-day	7.0E-02	mg/kg-day	0.00004
	Benzo(a)anthracene	9.4E-01	mg/kg	3.7E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	3.3E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Benzo(b)fluoranthene	6.3E-01	mg/kg	2.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.5E-05	mg/kg-day	2.0E-02	mg/kg-day	0.001
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	9.0E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	2.0E-06	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	6.9E-09	mg/kg-day	5.0E-05	mg/kg-day	0.0001
	4,4'-DDT	3.5E-03	mg/kg	3.2E-09	mg/kg-day	5.0E-04	mg/kg-day	0.00001
	Heptachlor epoxide	9.1E-03	mg/kg	2.8E-08	mg/kg-day	1.3E-05	mg/kg-day	0.002
	Aroclor 1248	8.7E+01	mg/kg	3.7E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	2.5E-04	mg/kg-day	2.0E-05	mg/kg-day	12
	Aroclor 1260	2.7E+01	mg/kg	1.2E-04	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	3.1E-03	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	9.8E-03	mg/kg-day	1.0E+00	mg/kg-day	0.01
	Antimony	2.7E+01	mg/kg	8.2E-06	mg/kg-day	6.0E-05	mg/kg-day	0.1
	Arsenic	1.4E+01	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Barium	3.4E+02	mg/kg	1.0E-04	mg/kg-day	1.4E-02	mg/kg-day	0.01
	Beryllium	1.8E+00	mg/kg	5.5E-07	mg/kg-day	1.4E-05	mg/kg-day	0.04
	Cadmium	2.0E+01	mg/kg	6.0E-07	mg/kg-day	2.5E-05	mg/kg-day	0.02
	Chromium (Total)	2.2E+03	mg/kg	6.6E-04	mg/kg-day	2.0E-02	mg/kg-day	0.03
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.5E-06	mg/kg-day	7.5E-05	mg/kg-day	0.02
	Cobalt	1.7E+02	mg/kg	5.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Copper	4.9E+03	mg/kg	1.5E-03	mg/kg-day	4.0E-02	mg/kg-day	0.04
	Cyanide	3.8E-01	mg/kg	1.1E-07	mg/kg-day	6.0E-04	mg/kg-day	0.0002
	Iron	7.4E+04	mg/kg	2.2E-02	mg/kg-day	7.0E-01	mg/kg-day	0.03
	Manganese	4.6E+02	mg/kg	1.4E-04	mg/kg-day	9.6E-04	mg/kg-day	0.1
	Nickel	5.7E+02	mg/kg	1.7E-04	mg/kg-day	8.0E-04	mg/kg-day	0.2
	Selenium	3.6E+00	mg/kg	1.1E-06	mg/kg-day	5.0E-03	mg/kg-day	0.0002
	Silver	4.3E+00	mg/kg	1.3E-06	mg/kg-day	2.0E-04	mg/kg-day	0.01
	Thallium	4.2E+00	mg/kg	1.3E-06	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Vanadium	9.9E+01	mg/kg	3.0E-05	mg/kg-day	1.3E-04	mg/kg-day	0.2
	Zinc	5.1E+03	mg/kg	1.5E-03	mg/kg-day	3.0E-01	mg/kg-day	0.01
	Mercury	4.6E+00	mg/kg	1.4E-06	mg/kg-day	2.1E-05	mg/kg-day	0.07
	Dioxin-like PCBs	9.7E-04	mg/kg	4.1E-09	mg/kg-day	7.0E-10	mg/kg-day	5.9
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.6E-10	mg/kg-day	7.0E-10	mg/kg-day	0.4
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								20

TABLE 7.71
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	2.0E-07	mg/m^3	2.0E-03	mg/m^3	0.0001
	Chlorobenzene	4.6E-03	mg/m^3	4.5E-03	mg/m^3	5.0E-02	mg/m^3	0.09
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	7.8E-05	mg/m^3	8.0E-01	mg/m^3	0.0001
	Benzo(a)anthracene	2.0E-07	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	6.0E-10	mg/m^3	2.0E-06	mg/m^3	0.0003
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	4.4E-10	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	3.5E-09	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	1.6E-10	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	3.7E-10	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	1.6E-12	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	2.5E-12	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	6.4E-12	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	1.2E-04	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	6.1E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	1.9E-05	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	1.2E-03	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	2.3E-05	mg/m^3	5.0E-03	mg/m^3	0.005
	Antimony	2.0E-08	mg/m^3	1.9E-08	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	9.8E-09	mg/m^3	1.5E-05	mg/m^3	0.0007
	Barium	2.5E-07	mg/m^3	2.4E-07	mg/m^3	5.0E-04	mg/m^3	0.0005
	Beryllium	1.3E-09	mg/m^3	1.3E-09	mg/m^3	2.0E-05	mg/m^3	0.00006
	Cadmium	1.4E-08	mg/m^3	1.4E-08	mg/m^3	1.0E-05	mg/m^3	0.001
	Chromium (Total)	1.6E-06	mg/m^3	1.5E-06	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	3.5E-09	mg/m^3	1.0E-04	mg/m^3	0.00003
	Cobalt	1.2E-07	mg/m^3	1.2E-07	mg/m^3	6.0E-06	mg/m^3	0.02
	Copper	3.6E-06	mg/m^3	3.5E-06	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	2.7E-10	mg/m^3	8.0E-04	mg/m^3	0.0000003
	Iron	5.4E-05	mg/m^3	5.2E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	3.3E-07	mg/m^3	5.0E-05	mg/m^3	0.007
	Nickel	4.2E-07	mg/m^3	4.0E-07	mg/m^3	9.0E-05	mg/m^3	0.004
	Selenium	2.7E-09	mg/m^3	2.6E-09	mg/m^3	2.0E-02	mg/m^3	0.0000001
	Silver	3.2E-09	mg/m^3	3.1E-09	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	2.9E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	7.0E-08	mg/m^3	1.0E-04	mg/m^3	0.0007
	Zinc	3.7E-06	mg/m^3	3.6E-06	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	4.7E-04	mg/m^3	3.0E-04	mg/m^3	2
	Dioxin-like PCBs	4.6E-10	mg/m^3	4.4E-10	mg/m^3	4.0E-08	mg/m^3	0.01
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	1.3E-10	mg/m^3	4.0E-08	mg/m^3	0.003
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								2
							Total of Receptor Hazards Across All Media	101

TABLE 7.72
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	5.8E-09	mg/kg-day	1.0E-02	mg/kg-day	0.000001
	Chlorobenzene	3.4E+01	mg/kg	4.1E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.2E-06	mg/kg-day	7.0E-02	mg/kg-day	0.00002
	Benzo(a)anthracene	9.4E-01	mg/kg	1.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Benzo(b)fluoranthene	6.3E-01	mg/kg	7.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	5.9E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	2.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	6.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	2.7E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00005
	4,4'-DDT	3.5E-03	mg/kg	4.2E-09	mg/kg-day	5.0E-04	mg/kg-day	0.00001
	Heptachlor epoxide	9.1E-03	mg/kg	1.1E-08	mg/kg-day	1.3E-05	mg/kg-day	0.0008
	Aroclor 1248	8.7E+01	mg/kg	1.0E-04	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	7.0E-05	mg/kg-day	2.0E-05	mg/kg-day	3
	Aroclor 1260	2.7E+01	mg/kg	3.3E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	8.7E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	3.9E-02	mg/kg-day	1.0E+00	mg/kg-day	0.04
	Antimony	2.7E+01	mg/kg	3.3E-05	mg/kg-day	4.0E-04	mg/kg-day	0.08
	Arsenic	1.4E+01	mg/kg	9.9E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Barium	3.4E+02	mg/kg	4.1E-04	mg/kg-day	2.0E-01	mg/kg-day	0.002
	Beryllium	1.8E+00	mg/kg	2.2E-06	mg/kg-day	2.0E-03	mg/kg-day	0.001
	Cadmium	2.0E+01	mg/kg	2.4E-05	mg/kg-day	1.0E-03	mg/kg-day	0.02
	Chromium (Total)	2.2E+03	mg/kg	2.6E-03	mg/kg-day	1.5E+00	mg/kg-day	0.002
	Chromium (Hexavalent)	4.9E+00	mg/kg	5.9E-06	mg/kg-day	3.0E-03	mg/kg-day	0.002
	Cobalt	1.7E+02	mg/kg	2.0E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	4.9E+03	mg/kg	5.9E-03	mg/kg-day	4.0E-02	mg/kg-day	0.1
	Cyanide	3.8E-01	mg/kg	4.5E-07	mg/kg-day	6.0E-04	mg/kg-day	0.001
	Iron	7.4E+04	mg/kg	8.9E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Manganese	4.6E+02	mg/kg	5.5E-04	mg/kg-day	2.4E-02	mg/kg-day	0.02
	Nickel	5.7E+02	mg/kg	6.9E-04	mg/kg-day	2.0E-02	mg/kg-day	0.03
	Selenium	3.6E+00	mg/kg	4.3E-06	mg/kg-day	5.0E-03	mg/kg-day	0.001
	Silver	4.3E+00	mg/kg	5.2E-06	mg/kg-day	5.0E-03	mg/kg-day	0.001
	Thallium	4.2E+00	mg/kg	5.0E-06	mg/kg-day	1.0E-05	mg/kg-day	0.5
	Vanadium	9.9E+01	mg/kg	1.2E-04	mg/kg-day	5.0E-03	mg/kg-day	0.02
	Zinc	5.1E+03	mg/kg	6.1E-03	mg/kg-day	3.0E-01	mg/kg-day	0.02
	Mercury	4.6E+00	mg/kg	5.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Dioxin-like PCBs	9.7E-04	mg/kg	1.2E-09	mg/kg-day	7.0E-10	mg/kg-day	2
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	3.5E-10	mg/kg-day	7.0E-10	mg/kg-day	0.5
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								7

TABLE 7.72
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	7.4E-10	mg/kg-day	1.0E-02	mg/kg-day	0.0000001
	Chlorobenzene	3.4E+01	mg/kg	5.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0003
	1,4-Dichlorobenzene	9.7E-01	mg/kg	4.9E-07	mg/kg-day	7.0E-02	mg/kg-day	0.000007
	Benzo(a)anthracene	9.4E-01	mg/kg	6.2E-07	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	8.5E-01	mg/kg	5.6E-07	mg/kg-day	3.0E-04	mg/kg-day	0.002
	Benzo(b)fluoranthene	6.3E-01	mg/kg	4.1E-07	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.5E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0001
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	1.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	3.4E-07	mg/kg-day	NV	mg/kg-day	NV
	Dieldrin	2.3E-03	mg/kg	1.2E-09	mg/kg-day	5.0E-05	mg/kg-day	0.00002
	4,4'-DDT	3.5E-03	mg/kg	5.4E-10	mg/kg-day	5.0E-04	mg/kg-day	0.000001
	Heptachlor epoxide	9.1E-03	mg/kg	4.6E-09	mg/kg-day	1.3E-05	mg/kg-day	0.0004
	Aroclor 1248	8.7E+01	mg/kg	6.2E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	5.8E+01	mg/kg	4.1E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	Aroclor 1260	2.7E+01	mg/kg	1.9E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	7.3E+02	mg/kg	5.2E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	3.2E+04	mg/kg	1.6E-03	mg/kg-day	1.0E+00	mg/kg-day	0.0
	Antimony	2.7E+01	mg/kg	1.4E-06	mg/kg-day	6.0E-05	mg/kg-day	0.0
	Arsenic	1.4E+01	mg/kg	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Barium	3.4E+02	mg/kg	1.7E-05	mg/kg-day	1.4E-02	mg/kg-day	0.001
	Beryllium	1.8E+00	mg/kg	9.1E-08	mg/kg-day	1.4E-05	mg/kg-day	0.01
	Cadmium	2.0E+01	mg/kg	1.0E-07	mg/kg-day	2.5E-05	mg/kg-day	0.004
	Chromium (Total)	2.2E+03	mg/kg	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.0
	Chromium (Hexavalent)	4.9E+00	mg/kg	2.5E-07	mg/kg-day	7.5E-05	mg/kg-day	0.0
	Cobalt	1.7E+02	mg/kg	8.6E-06	mg/kg-day	3.0E-04	mg/kg-day	0.0
	Copper	4.9E+03	mg/kg	2.5E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
	Cyanide	3.8E-01	mg/kg	1.9E-08	mg/kg-day	6.0E-04	mg/kg-day	0.0
	Iron	7.4E+04	mg/kg	3.7E-03	mg/kg-day	7.0E-01	mg/kg-day	0.0
	Manganese	4.6E+02	mg/kg	2.3E-05	mg/kg-day	9.6E-04	mg/kg-day	0.0
	Nickel	5.7E+02	mg/kg	2.9E-05	mg/kg-day	8.0E-04	mg/kg-day	0.04
	Selenium	3.6E+00	mg/kg	1.8E-07	mg/kg-day	5.0E-03	mg/kg-day	0.00004
	Silver	4.3E+00	mg/kg	2.2E-07	mg/kg-day	2.0E-04	mg/kg-day	0.001
	Thallium	4.2E+00	mg/kg	2.1E-07	mg/kg-day	1.0E-05	mg/kg-day	0.0
	Vanadium	9.9E+01	mg/kg	5.0E-06	mg/kg-day	1.3E-04	mg/kg-day	0.0
	Zinc	5.1E+03	mg/kg	2.6E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	4.6E+00	mg/kg	2.3E-07	mg/kg-day	2.1E-05	mg/kg-day	0.01
	Dioxin-like PCBs	9.7E-04	mg/kg	6.8E-10	mg/kg-day	7.0E-10	mg/kg-day	1.0
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	4.4E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								3

TABLE 7.72
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	2.0E-07	mg/m^3	2.0E-03	mg/m^3	0.0001
	Chlorobenzene	4.6E-03	mg/m^3	4.5E-03	mg/m^3	5.0E-02	mg/m^3	0.09
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	7.8E-05	mg/m^3	8.0E-01	mg/m^3	0.0001
	Benzo(a)anthracene	2.0E-07	mg/m^3	1.9E-07	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	6.2E-10	mg/m^3	6.0E-10	mg/m^3	2.0E-06	mg/m^3	0.0003
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	4.4E-10	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	3.5E-09	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	1.6E-10	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	3.7E-10	mg/m^3	NV	mg/m^3	NV
	Dieldrin	1.7E-12	mg/m^3	1.6E-12	mg/m^3	NV	mg/m^3	NV
	4,4'-DDT	2.6E-12	mg/m^3	2.5E-12	mg/m^3	NV	mg/m^3	NV
	Heptachlor epoxide	6.7E-12	mg/m^3	6.4E-12	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	1.3E-04	mg/m^3	1.2E-04	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	6.4E-05	mg/m^3	6.1E-05	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	1.9E-05	mg/m^3	1.9E-05	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	1.3E-03	mg/m^3	1.2E-03	mg/m^3	NV	mg/m^3	NV
	Aluminum	2.4E-05	mg/m^3	2.3E-05	mg/m^3	5.0E-03	mg/m^3	0.005
	Antimony	2.0E-08	mg/m^3	1.9E-08	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.0E-08	mg/m^3	9.8E-09	mg/m^3	1.5E-05	mg/m^3	0.001
	Barium	2.5E-07	mg/m^3	2.4E-07	mg/m^3	5.0E-04	mg/m^3	0.0005
	Beryllium	1.3E-09	mg/m^3	1.3E-09	mg/m^3	2.0E-05	mg/m^3	0.0001
	Cadmium	1.4E-08	mg/m^3	1.4E-08	mg/m^3	1.0E-05	mg/m^3	0.001
	Chromium (Total)	1.6E-06	mg/m^3	1.5E-06	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	3.5E-09	mg/m^3	1.0E-04	mg/m^3	0.00003
	Cobalt	1.2E-07	mg/m^3	1.2E-07	mg/m^3	6.0E-06	mg/m^3	0.02
	Copper	3.6E-06	mg/m^3	3.5E-06	mg/m^3	NV	mg/m^3	NV
	Cyanide	2.8E-10	mg/m^3	2.7E-10	mg/m^3	8.0E-04	mg/m^3	0.0000003
	Iron	5.4E-05	mg/m^3	5.2E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	3.4E-07	mg/m^3	3.3E-07	mg/m^3	5.0E-05	mg/m^3	0.01
	Nickel	4.2E-07	mg/m^3	4.0E-07	mg/m^3	9.0E-05	mg/m^3	0.004
	Selenium	2.7E-09	mg/m^3	2.6E-09	mg/m^3	2.0E-02	mg/m^3	0.0000001
	Silver	3.2E-09	mg/m^3	3.1E-09	mg/m^3	NV	mg/m^3	NV
	Thallium	3.1E-09	mg/m^3	2.9E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	7.3E-08	mg/m^3	7.0E-08	mg/m^3	1.0E-04	mg/m^3	0.001
	Zinc	3.7E-06	mg/m^3	3.6E-06	mg/m^3	NV	mg/m^3	NV
	Mercury	4.9E-04	mg/m^3	4.7E-04	mg/m^3	3.0E-04	mg/m^3	2
	Dioxin-like PCBs	4.6E-10	mg/m^3	4.4E-10	mg/m^3	4.0E-08	mg/m^3	0.01
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	1.3E-10	mg/m^3	4.0E-08	mg/m^3	0.003
	Bismuth-212	1.0E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	1.7E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	9.4E-02	pCi/g	--	--	NV	--	NV
	Lead-210	2.2E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.2E-01	pCi/g	--	--	NV	--	NV
	Lead-214	1.9E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.1E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	3.5E+01	pCi/g	--	--	NV	--	NV
	Radium-228	8.5E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	1.2E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								2
						Total of Receptor Hazards Across All Media		12

Table 7.73
Lead Risk-based Concentration for the Adult - Trespasser/Site Visitor/Recreational User/Fisherman
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Trespasser/Site Visitor/Recreational User/Fisherman
Receptor Age: Adult

PbS calculated	Lead Concentration in Soil	Current/Future	Exceedance?
4.11E+03	2.79E+03	Current (Surface Soil)	NO
4.11E+03	1.61E+03	Future (Combined Soil)	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

7.73

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Soil Lead Concentration expressed in ug/g;	4,108	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of soil (g/day);	0.05	B
AF	Gastrointestinal absorption fraction for ingested lead in soil and lead in dust from soil (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	60	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.74
Lead Risk-based Concentration for the Adult - Outdoor Maintenance Worker
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

PbS calculated	Lead Concentration in Soil	Exceedance?
1.13E+03	1.61E+03	YES

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{\wedge}1.645) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Soil Lead Concentration expressed in ug/g;	1,126	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of soil (g/day);	0.05	B
AF	Gastrointestinal absorption fraction for ingested lead in soil and lead in dust from soil (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	219	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.75
Lead Risk-based Concentration for the Adult - Resident
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Adult

PbS calculated	Lead Concentration in Soil	Exceedance?
7.04E+02	2.79E+03	YES

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Soil Lead Concentration expressed in ug/g;	704	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of soil (g/day);	0.05	B
AF	Gastrointestinal absorption fraction for ingested lead in soil and lead in dust from soil (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	350	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.76
Lead Risk-based Concentration for the Adult - Construction Worker (Default Project)
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Construction Worker (Default Project)
Receptor Age: Adult

PbS calculated	Lead Concentration in Soil	Exceedance?
2.81E+02	2.79E+03	YES

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Soil Lead Concentration expressed in ug/g;	281	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of soil (g/day);	0.2	B
AF	Gastrointestinal absorption fraction for ingested lead in soil and lead in dust from soil (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	219	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.77
Lead Risk-based Concentration for the Adult - Utility Worker
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Soil
Exposure Point: Site Soil
Receptor Population: Utility Worker
Receptor Age: Adult

PbS calculated	Lead Concentration in Soil	Exceedance?
3.08E+03	1.61E+03	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Soil Lead Concentration expressed in ug/g;	3,081	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of soil (g/day);	0.2	B
AF	Gastrointestinal absorption fraction for ingested lead in soil and lead in dust from soil (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	20	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Soil. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.78
Lead Risk-based Concentration for the Adult - Trespasser/Site Visitor/Recreational User/Fisherman
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Trespasser/Visitor/Recreational User/Fisherman
Receptor Age: Adult

PbS calculated	Lead Concentration in Sediment	Exceedance?
4.11E+03	2.76E+02	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{\wedge}1.645) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Sediment Lead Concentration expressed in ug/g;	4,108	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of Sediment (g/day);	0.05	B
AF	Gastrointestinal absorption fraction for ingested lead in Sediment and lead in dust from Sediment (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	60	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Sediment. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.79
Lead Risk-based Concentration for the Adult - Resident
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Resident
Receptor Age: Adult

PbS calculated	Lead Concentration in Sediment	Exceedance?
4.11E+03	2.76E+02	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Sediment Lead Concentration expressed in ug/g;	4,108	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of Sediment (g/day);	0.05	B
AF	Gastrointestinal absorption fraction for ingested lead in Sediment and lead in dust from Sediment (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	60	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Sediment. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.80
Lead Risk-based Concentration for the Adult - Construction Worker (Dock Project)
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Construction Worker (Dock Project)
Receptor Age: Adult

PbS calculated	Lead Concentration in Sediment	Exceedance?
6.85E+02	2.76E+02	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Sediment Lead Concentration expressed in ug/g;	685	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of Sediment (g/day);	0.2	B
AF	Gastrointestinal absorption fraction for ingested lead in Sediment and lead in dust from Sediment (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	90	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Sediment. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

Table 7.81
Lead Risk-based Concentration for the Adult - Utility Worker
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Utility Worker
Receptor Age: Adult

PbS calculated	Lead Concentration in Sediment	Exceedance?
3.08E+03	2.76E+02	NO

$$PbB_{adult,\ central} = PbB_{fetal,\ 0.95,goal} / ((GSD^{1.645}) * R)$$

$$PbS = ((PbB_{adult,\ central} - PbB_{adult,0}) * AT) / (BKSF * IR * AF * EF)$$

Exposure Parameter	Description	Industrial Adult Values	Source
PbS	Calculated Sediment Lead Concentration expressed in ug/g;	3,081	Calc.
$PbB_{adult,central}$	Central estimate of Blood Lead Concentrations in adults exposed to the site expressed in ug/dl;	2.32	Calc.
$PbB_{fetal,0.95,goal}$	Goal for 95th % blood lead concentration (ug/dl);	5	A, B
GSD	Geometric standard deviation (dimensionless);	1.7	B
R	Constant of proportionality between fetal blood lead concentration at birth and maternal blood lead concentration (dimensionless);	0.9	A, B
$PbB_{adult,0}$	Typical Blood Lead Concentration in the absence of exposure to the site expressed in ug/dL;	0.70	B
AT	Averaging Time (days/year)	365	A, B
BKSF	Biokinetic Slope Factor expressed in ug/dL blood lead increase per ug/day lead uptake;	0.4	A, B
IR	Intake rate of Sediment (g/day);	0.2	B
AF	Gastrointestinal absorption fraction for ingested lead in Sediment and lead in dust from Sediment (dimensionless)	0.12	A, B
EF	Exposure frequency (days/year)	20	A, B

A - EPA, January 2003. *Recommendations of the Technical Review Group for Lead for an Approach to Assessing Risks Associated with Adult Exposure to Lead in Sediment. EPA-540-R-03-001*

B - EPA, August 2016. *Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters.* OSWER 9285.6-55.

TABLE 7.82
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	2.4E-05	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	2.2E-05	mg/kg-day	3.0E-04	mg/kg-day	0.07
	Benzo(b)fluoranthene	2.2E+00	mg/kg	2.8E-05	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	1.8E-04	mg/kg-day	2.0E-02	mg/kg-day	0.009
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	6.8E-06	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	1.5E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	6.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	3.1E-05	mg/kg-day	2.0E-05	mg/kg-day	2
	Aroclor 1260	6.2E+00	mg/kg	7.9E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	1.5E-04	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	1.2E+00	mg/kg-day	1.0E+00	mg/kg-day	1
	Antimony	3.5E+01	mg/kg	4.4E-04	mg/kg-day	4.0E-04	mg/kg-day	1
	Arsenic	1.5E+01	mg/kg	1.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Barium	4.3E+02	mg/kg	5.5E-03	mg/kg-day	2.0E-01	mg/kg-day	0.03
	Cadmium	2.0E+01	mg/kg	2.6E-04	mg/kg-day	1.0E-03	mg/kg-day	0.3
	Chromium (Total)	3.6E+02	mg/kg	4.6E-03	mg/kg-day	1.5E+00	mg/kg-day	0.003
	Chromium (Hexavalent)	1.8E+01	mg/kg	2.3E-04	mg/kg-day	3.0E-03	mg/kg-day	0.08
	Cobalt	1.6E+02	mg/kg	2.1E-03	mg/kg-day	3.0E-04	mg/kg-day	7
	Copper	6.5E+03	mg/kg	8.4E-02	mg/kg-day	4.0E-02	mg/kg-day	2
	Iron	1.6E+05	mg/kg	2.1E+00	mg/kg-day	7.0E-01	mg/kg-day	3
	Manganese	6.8E+02	mg/kg	8.6E-03	mg/kg-day	2.4E-02	mg/kg-day	0.4
	Nickel	3.6E+02	mg/kg	4.6E-03	mg/kg-day	2.0E-02	mg/kg-day	0.2
	Silver	9.7E+00	mg/kg	1.2E-04	mg/kg-day	5.0E-03	mg/kg-day	0.02
	Thallium	1.0E+01	mg/kg	1.3E-04	mg/kg-day	1.0E-05	mg/kg-day	13
	Vanadium	2.6E+02	mg/kg	3.3E-03	mg/kg-day	5.0E-03	mg/kg-day	0.7
	Zinc	7.7E+03	mg/kg	9.9E-02	mg/kg-day	3.0E-01	mg/kg-day	0.3
	Mercury	7.7E+00	mg/kg	9.8E-05	mg/kg-day	3.0E-04	mg/kg-day	0.3
	Dioxin-like PCBs	2.4E-04	mg/kg	3.0E-09	mg/kg-day	7.0E-10	mg/kg-day	4
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	6.5E-09	mg/kg-day	7.0E-10	mg/kg-day	9
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								45

TABLE 7.82
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	7.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	6.8E-06	mg/kg-day	3.0E-04	mg/kg-day	0.02
	Benzo(b)fluoranthene	2.2E+00	mg/kg	8.5E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	4.3E-05	mg/kg-day	2.0E-02	mg/kg-day	0.002
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	2.1E-06	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	4.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	2.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	1.0E-05	mg/kg-day	2.0E-05	mg/kg-day	1
	Aroclor 1260	6.2E+00	mg/kg	2.6E-05	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	5.0E-05	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	2.9E-02	mg/kg-day	1.0E+00	mg/kg-day	0.0
	Antimony	3.5E+01	mg/kg	1.0E-05	mg/kg-day	6.0E-05	mg/kg-day	0.2
	Arsenic	1.5E+01	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Barium	4.3E+02	mg/kg	1.3E-04	mg/kg-day	1.4E-02	mg/kg-day	0.01
	Cadmium	2.0E+01	mg/kg	6.1E-07	mg/kg-day	2.5E-05	mg/kg-day	0.02
	Chromium (Total)	3.6E+02	mg/kg	1.1E-04	mg/kg-day	2.0E-02	mg/kg-day	0.0
	Chromium (Hexavalent)	1.8E+01	mg/kg	5.4E-06	mg/kg-day	7.5E-05	mg/kg-day	0.1
	Cobalt	1.6E+02	mg/kg	4.9E-05	mg/kg-day	3.0E-04	mg/kg-day	0.2
	Copper	6.5E+03	mg/kg	2.0E-03	mg/kg-day	4.0E-02	mg/kg-day	0.05
	Iron	1.6E+05	mg/kg	5.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Manganese	6.8E+02	mg/kg	2.1E-04	mg/kg-day	9.6E-04	mg/kg-day	0.2
	Nickel	3.6E+02	mg/kg	1.1E-04	mg/kg-day	8.0E-04	mg/kg-day	0.1
	Silver	9.7E+00	mg/kg	3.0E-06	mg/kg-day	2.0E-04	mg/kg-day	0.01
	Thallium	1.0E+01	mg/kg	3.1E-06	mg/kg-day	1.0E-05	mg/kg-day	0.3
	Vanadium	2.6E+02	mg/kg	7.8E-05	mg/kg-day	1.3E-04	mg/kg-day	0.6
	Zinc	7.7E+03	mg/kg	2.3E-03	mg/kg-day	3.0E-01	mg/kg-day	0.01
	Mercury	7.7E+00	mg/kg	2.3E-06	mg/kg-day	2.1E-05	mg/kg-day	0.11
	Dioxin-like PCBs	2.4E-04	mg/kg	1.0E-09	mg/kg-day	7.0E-10	mg/kg-day	1
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	4.7E-10	mg/kg-day	7.0E-10	mg/kg-day	1
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								5

TABLE 7.82
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	3.8E-07	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.3E-09	mg/m^3	1.2E-09	mg/m^3	2.0E-06	mg/m^3	0.0006
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	1.5E-09	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	1.0E-08	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	3.7E-10	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	8.3E-10	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	6.9E-06	mg/m^3	6.6E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	2.6E-06	mg/m^3	2.5E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	4.4E-06	mg/m^3	4.2E-06	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	2.1E-05	mg/m^3	2.0E-05	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.1E-05	mg/m^3	6.8E-05	mg/m^3	5.0E-03	mg/m^3	0.01
	Antimony	2.5E-08	mg/m^3	2.4E-08	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.1E-08	mg/m^3	1.0E-08	mg/m^3	1.5E-05	mg/m^3	0.0007
	Barium	3.2E-07	mg/m^3	3.0E-07	mg/m^3	5.0E-04	mg/m^3	0.0006
	Cadmium	1.5E-08	mg/m^3	1.4E-08	mg/m^3	1.0E-05	mg/m^3	0.001
	Chromium (Total)	2.6E-07	mg/m^3	2.5E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	1.2E-08	mg/m^3	1.0E-04	mg/m^3	0.0001
	Cobalt	1.2E-07	mg/m^3	1.1E-07	mg/m^3	6.0E-06	mg/m^3	0.02
	Copper	4.8E-06	mg/m^3	4.6E-06	mg/m^3	NV	mg/m^3	NV
	Iron	1.2E-04	mg/m^3	1.2E-04	mg/m^3	NV	mg/m^3	NV
	Manganese	5.0E-07	mg/m^3	4.8E-07	mg/m^3	5.0E-05	mg/m^3	0.01
	Nickel	2.6E-07	mg/m^3	2.5E-07	mg/m^3	9.0E-05	mg/m^3	0.003
	Silver	7.2E-09	mg/m^3	6.9E-09	mg/m^3	NV	mg/m^3	NV
	Thallium	7.6E-09	mg/m^3	7.3E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	1.9E-07	mg/m^3	1.8E-07	mg/m^3	1.0E-04	mg/m^3	0.002
	Zinc	5.7E-06	mg/m^3	5.4E-06	mg/m^3	NV	mg/m^3	NV
	Mercury	8.2E-04	mg/m^3	7.8E-04	mg/m^3	3.0E-04	mg/m^3	3
	Dioxin-like PCBs	1.1E-10	mg/m^3	1.1E-10	mg/m^3	4.0E-08	mg/m^3	0.003
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	2.3E-10	mg/m^3	4.0E-08	mg/m^3	0.006
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								3
							Total of Receptor Hazards Across All Media	53

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.83
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	2.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	2.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
	Benzo(b)fluoranthene	2.2E+00	mg/kg	2.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	1.7E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0008
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	6.3E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	1.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	5.6E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	2.9E-06	mg/kg-day	2.0E-05	mg/kg-day	0.1
	Aroclor 1260	6.2E+00	mg/kg	7.4E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	1.4E-05	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	1.2E-01	mg/kg-day	1.0E+00	mg/kg-day	0.1
	Antimony	3.5E+01	mg/kg	4.1E-05	mg/kg-day	4.0E-04	mg/kg-day	0.1
	Arsenic	1.5E+01	mg/kg	1.1E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Barium	4.3E+02	mg/kg	5.1E-04	mg/kg-day	2.0E-01	mg/kg-day	0.003
	Cadmium	2.0E+01	mg/kg	2.4E-05	mg/kg-day	1.0E-03	mg/kg-day	0.02
	Chromium (Total)	3.6E+02	mg/kg	4.3E-04	mg/kg-day	1.5E+00	mg/kg-day	0.0003
	Chromium (Hexavalent)	1.8E+01	mg/kg	2.1E-05	mg/kg-day	3.0E-03	mg/kg-day	0.007
	Cobalt	1.6E+02	mg/kg	2.0E-04	mg/kg-day	3.0E-04	mg/kg-day	0.7
	Copper	6.5E+03	mg/kg	7.8E-03	mg/kg-day	4.0E-02	mg/kg-day	0.2
	Iron	1.6E+05	mg/kg	2.0E-01	mg/kg-day	7.0E-01	mg/kg-day	0.3
	Manganese	6.8E+02	mg/kg	8.1E-04	mg/kg-day	2.4E-02	mg/kg-day	0.03
	Nickel	3.6E+02	mg/kg	4.3E-04	mg/kg-day	2.0E-02	mg/kg-day	0.02
	Silver	9.7E+00	mg/kg	1.2E-05	mg/kg-day	5.0E-03	mg/kg-day	0.002
	Thallium	1.0E+01	mg/kg	1.2E-05	mg/kg-day	1.0E-05	mg/kg-day	1
	Vanadium	2.6E+02	mg/kg	3.1E-04	mg/kg-day	5.0E-03	mg/kg-day	0.06
	Zinc	7.7E+03	mg/kg	9.3E-03	mg/kg-day	3.0E-01	mg/kg-day	0.03
	Mercury	7.7E+00	mg/kg	9.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Dioxin-like PCBs	2.4E-04	mg/kg	2.8E-10	mg/kg-day	7.0E-10	mg/kg-day	0.4
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	6.1E-10	mg/kg-day	7.0E-10	mg/kg-day	0.9
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								4

TABLE 7.83
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	1.2E-06	mg/kg-day	NV	mg/kg-day	NV
	Benzo(a)pyrene	1.7E+00	mg/kg	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day	0.004
	Benzo(b)fluoranthene	2.2E+00	mg/kg	1.4E-06	mg/kg-day	NV	mg/kg-day	NV
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	7.2E-06	mg/kg-day	2.0E-02	mg/kg-day	0.0004
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	3.5E-07	mg/kg-day	NV	mg/kg-day	NV
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	7.7E-07	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1248	4.7E+00	mg/kg	3.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Aroclor 1254	2.4E+00	mg/kg	1.7E-06	mg/kg-day	2.0E-05	mg/kg-day	0
	Aroclor 1260	6.2E+00	mg/kg	4.4E-06	mg/kg-day	NV	mg/kg-day	NV
	High Risk PCB Congeners	1.2E+01	mg/kg	8.3E-06	mg/kg-day	NV	mg/kg-day	NV
	Aluminum	9.6E+04	mg/kg	4.9E-03	mg/kg-day	1.0E+00	mg/kg-day	0.005
	Antimony	3.5E+01	mg/kg	1.7E-06	mg/kg-day	6.0E-05	mg/kg-day	0.03
	Arsenic	1.5E+01	mg/kg	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Barium	4.3E+02	mg/kg	2.2E-05	mg/kg-day	1.4E-02	mg/kg-day	0.002
	Cadmium	2.0E+01	mg/kg	1.0E-07	mg/kg-day	2.5E-05	mg/kg-day	0.004
	Chromium (Total)	3.6E+02	mg/kg	1.8E-05	mg/kg-day	2.0E-02	mg/kg-day	0.0009
	Chromium (Hexavalent)	1.8E+01	mg/kg	8.9E-07	mg/kg-day	7.5E-05	mg/kg-day	0.01
	Cobalt	1.6E+02	mg/kg	8.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Copper	6.5E+03	mg/kg	3.3E-04	mg/kg-day	4.0E-02	mg/kg-day	0.01
	Iron	1.6E+05	mg/kg	8.3E-03	mg/kg-day	7.0E-01	mg/kg-day	0.01
	Manganese	6.8E+02	mg/kg	3.4E-05	mg/kg-day	9.6E-04	mg/kg-day	0.04
	Nickel	3.6E+02	mg/kg	1.8E-05	mg/kg-day	8.0E-04	mg/kg-day	0.02
	Silver	9.7E+00	mg/kg	4.9E-07	mg/kg-day	2.0E-04	mg/kg-day	0.002
	Thallium	1.0E+01	mg/kg	5.2E-07	mg/kg-day	1.0E-05	mg/kg-day	0.1
	Vanadium	2.6E+02	mg/kg	1.3E-05	mg/kg-day	1.3E-04	mg/kg-day	0.1
	Zinc	7.7E+03	mg/kg	3.9E-04	mg/kg-day	3.0E-01	mg/kg-day	0.001
	Mercury	7.7E+00	mg/kg	3.9E-07	mg/kg-day	2.1E-05	mg/kg-day	0.018
	Dioxin-like PCBs	2.4E-04	mg/kg	1.7E-10	mg/kg-day	7.0E-10	mg/kg-day	0.2
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	7.8E-11	mg/kg-day	7.0E-10	mg/kg-day	0.1
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								1

TABLE 7.83
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	3.8E-07	mg/m^3	NV	mg/m^3	NV
	Benzo(a)pyrene	1.3E-09	mg/m^3	1.2E-09	mg/m^3	2.0E-06	mg/m^3	0.0006
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	1.5E-09	mg/m^3	NV	mg/m^3	NV
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	1.0E-08	mg/m^3	NV	mg/m^3	NV
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	3.7E-10	mg/m^3	NV	mg/m^3	NV
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	8.3E-10	mg/m^3	NV	mg/m^3	NV
	Aroclor 1248	6.9E-06	mg/m^3	6.6E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1254	2.6E-06	mg/m^3	2.5E-06	mg/m^3	NV	mg/m^3	NV
	Aroclor 1260	4.4E-06	mg/m^3	4.2E-06	mg/m^3	NV	mg/m^3	NV
	High Risk PCB Congeners	2.1E-05	mg/m^3	2.0E-05	mg/m^3	NV	mg/m^3	NV
	Aluminum	7.1E-05	mg/m^3	6.8E-05	mg/m^3	5.0E-03	mg/m^3	0.01
	Antimony	2.5E-08	mg/m^3	2.4E-08	mg/m^3	NV	mg/m^3	NV
	Arsenic	1.1E-08	mg/m^3	1.0E-08	mg/m^3	1.5E-05	mg/m^3	0.001
	Barium	3.2E-07	mg/m^3	3.0E-07	mg/m^3	5.0E-04	mg/m^3	0.0006
	Cadmium	1.5E-08	mg/m^3	1.4E-08	mg/m^3	1.0E-05	mg/m^3	0.001
	Chromium (Total)	2.6E-07	mg/m^3	2.5E-07	mg/m^3	NV	mg/m^3	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	1.2E-08	mg/m^3	1.0E-04	mg/m^3	0.0001
	Cobalt	1.2E-07	mg/m^3	1.1E-07	mg/m^3	6.0E-06	mg/m^3	0.02
	Copper	4.8E-06	mg/m^3	4.6E-06	mg/m^3	NV	mg/m^3	NV
	Iron	1.2E-04	mg/m^3	1.2E-04	mg/m^3	NV	mg/m^3	NV
	Manganese	5.0E-07	mg/m^3	4.8E-07	mg/m^3	5.0E-05	mg/m^3	0.01
	Nickel	2.6E-07	mg/m^3	2.5E-07	mg/m^3	9.0E-05	mg/m^3	0.003
	Silver	7.2E-09	mg/m^3	6.9E-09	mg/m^3	NV	mg/m^3	NV
	Thallium	7.6E-09	mg/m^3	7.3E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	1.9E-07	mg/m^3	1.8E-07	mg/m^3	1.0E-04	mg/m^3	0.002
	Zinc	5.7E-06	mg/m^3	5.4E-06	mg/m^3	NV	mg/m^3	NV
	Mercury	8.2E-04	mg/m^3	7.8E-04	mg/m^3	3.0E-04	mg/m^3	3
	Dioxin-like PCBs	1.1E-10	mg/m^3	1.1E-10	mg/m^3	4.0E-08	mg/m^3	0.003
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	2.3E-10	mg/m^3	4.0E-08	mg/m^3	0.006
	Bismuth-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	2.1E+02	pCi/g	--	--	NV	--	NV
	Cesium-137	1.0E-01	pCi/g	--	--	NV	--	NV
	Lead-210	3.9E+02	pCi/g	--	--	NV	--	NV
	Lead-212	8.1E-01	pCi/g	--	--	NV	--	NV
	Lead-214	2.3E+02	pCi/g	--	--	NV	--	NV
	Potassium-40	9.4E+00	pCi/g	--	--	NV	--	NV
	Protactinium-234M	2.7E+00	pCi/g	--	--	NV	--	NV
	Radium-226	2.3E+00	pCi/g	--	--	NV	--	NV
	Radium-228	8.8E-01	pCi/g	--	--	NV	--	NV
	Thallium-208	2.7E-01	pCi/g	--	--	NV	--	NV
	Thorium-234	1.1E+00	pCi/g	--	--	NV	--	NV
	Uranium-235	2.1E-01	pCi/g	--	--	NV	--	NV
Inhalation Route Total								3
							Total of Receptor Hazards Across All Media	8

Notes:
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.
Vapor pressues for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03
Inhalation risk = Adjusted CA/Reference Concentration

TABLE 7.84
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Cradock Community Sediment
Exposure Medium: Sediment
Exposure Point: Cradock Community Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Aluminum	2.0E+04	mg/kg	2.6E-01	mg/kg-day	1.0E+00	mg/kg-day	0.3
	Arsenic	1.4E+01	mg/kg	1.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Cobalt	8.8E+01	mg/kg	1.1E-03	mg/kg-day	3.0E-04	mg/kg-day	4
	Iron	4.1E+04	mg/kg	5.3E-01	mg/kg-day	7.0E-01	mg/kg-day	0.8
	Manganese	2.5E+02	mg/kg	3.2E-03	mg/kg-day	2.4E-02	mg/kg-day	0.1
	Thallium	1.8E+00	mg/kg	2.3E-05	mg/kg-day	1.0E-05	mg/kg-day	2
	Vanadium	5.2E+01	mg/kg	6.7E-04	mg/kg-day	5.0E-03	mg/kg-day	0.1
	Mercury	7.4E-01	mg/kg	9.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Bismuth-212	1.3E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Lead-214	7.2E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.7E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.2E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.5E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								8
Dermal Absorption and External Exposure to Ionizing Radiation								
	Aluminum	2.0E+04	mg/kg	6.2E-03	mg/kg-day	1.0E+00	mg/kg-day	0.006
	Arsenic	1.4E+01	mg/kg	1.3E-05	mg/kg-day	3.0E-04	mg/kg-day	0.04
	Cobalt	8.8E+01	mg/kg	2.7E-05	mg/kg-day	3.0E-04	mg/kg-day	0.09
	Iron	4.1E+04	mg/kg	1.3E-02	mg/kg-day	7.0E-01	mg/kg-day	0.02
	Manganese	2.5E+02	mg/kg	7.7E-05	mg/kg-day	9.6E-04	mg/kg-day	0.08
	Thallium	1.8E+00	mg/kg	5.5E-07	mg/kg-day	1.0E-05	mg/kg-day	0.06
	Vanadium	5.2E+01	mg/kg	1.6E-05	mg/kg-day	1.3E-04	mg/kg-day	0.1
	Mercury	7.4E-01	mg/kg	2.3E-07	mg/kg-day	2.1E-05	mg/kg-day	0.0107
	Bismuth-212	1.3E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Lead-214	7.2E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.7E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.2E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.5E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.4

TABLE 7.84
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Cradock Community Sediment
Exposure Medium: Sediment
Exposure Point: Cradock Community Sediment
Receptor Population: Resident
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Aluminum	1.5E-05	mg/m^3	1.4E-05	mg/m^3	5.0E-03	mg/m^3	0.003
	Arsenic	1.1E-08	mg/m^3	1.0E-08	mg/m^3	1.5E-05	mg/m^3	0.0007
	Cobalt	6.5E-08	mg/m^3	6.2E-08	mg/m^3	6.0E-06	mg/m^3	0.01
	Iron	3.0E-05	mg/m^3	2.9E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	1.9E-07	mg/m^3	1.8E-07	mg/m^3	5.0E-05	mg/m^3	0.004
	Thallium	1.3E-09	mg/m^3	1.3E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	3.8E-08	mg/m^3	3.7E-08	mg/m^3	1.0E-04	mg/m^3	0.0004
	Mercury	7.9E-05	mg/m^3	7.6E-05	mg/m^3	3.0E-04	mg/m^3	0.3
	Bismuth-212	9.5E-10	pCi/L	--	--	NV	--	NV
	Bismuth-214	4.5E-10	pCi/L	--	--	NV	--	NV
	Lead-212	7.9E-10	pCi/L	--	--	NV	--	NV
	Lead-214	5.3E-10	pCi/L	--	--	NV	--	NV
	Potassium-40	1.2E-08	pCi/L	--	--	NV	--	NV
	Radium-228	8.9E-10	pCi/L	--	--	NV	--	NV
	Thallium-208	2.6E-10	pCi/L	--	--	NV	--	NV
Inhalation Route Total								0.3
							Total of Receptor Hazards Across All Media	8

TABLE 7.85
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Cradock Community Sediment
Exposure Medium: Sediment
Exposure Point: Cradock Community Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Ingestion								
	Aluminum	2.0E+04	mg/kg	2.4E-02	mg/kg-day	1.0E+00	mg/kg-day	0.02
	Arsenic	1.4E+01	mg/kg	1.0E-05	mg/kg-day	3.0E-04	mg/kg-day	0.03
	Cobalt	8.8E+01	mg/kg	1.1E-04	mg/kg-day	3.0E-04	mg/kg-day	0.4
	Iron	4.1E+04	mg/kg	5.0E-02	mg/kg-day	7.0E-01	mg/kg-day	0.1
	Manganese	2.5E+02	mg/kg	3.0E-04	mg/kg-day	2.4E-02	mg/kg-day	0.01
	Thallium	1.8E+00	mg/kg	2.2E-06	mg/kg-day	1.0E-05	mg/kg-day	0.2
	Vanadium	5.2E+01	mg/kg	6.3E-05	mg/kg-day	5.0E-03	mg/kg-day	0.01
	Mercury	7.4E-01	mg/kg	8.9E-07	mg/kg-day	3.0E-04	mg/kg-day	0.003
	Bismuth-212	1.3E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Lead-214	7.2E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.7E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.2E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.5E-01	pCi/g	--	--	NV	--	NV
Ingestion Route Total								0.7
Dermal Absorption and External Exposure to Ionizing Radiation								
	Aluminum	2.0E+04	mg/kg	1.0E-03	mg/kg-day	1.0E+00	mg/kg-day	0.001
	Arsenic	1.4E+01	mg/kg	2.2E-06	mg/kg-day	3.0E-04	mg/kg-day	0.007
	Cobalt	8.8E+01	mg/kg	4.5E-06	mg/kg-day	3.0E-04	mg/kg-day	0.01
	Iron	4.1E+04	mg/kg	2.1E-03	mg/kg-day	7.0E-01	mg/kg-day	0.003
	Manganese	2.5E+02	mg/kg	1.3E-05	mg/kg-day	9.6E-04	mg/kg-day	0.01
	Thallium	1.8E+00	mg/kg	9.2E-08	mg/kg-day	1.0E-05	mg/kg-day	0.009
	Vanadium	5.2E+01	mg/kg	2.6E-06	mg/kg-day	1.3E-04	mg/kg-day	0.02
	Mercury	7.4E-01	mg/kg	3.8E-08	mg/kg-day	2.1E-05	mg/kg-day	0.0018
	Bismuth-212	1.3E+00	pCi/g	--	--	NV	--	NV
	Bismuth-214	6.2E-01	pCi/g	--	--	NV	--	NV
	Lead-212	1.1E+00	pCi/g	--	--	NV	--	NV
	Lead-214	7.2E-01	pCi/g	--	--	NV	--	NV
	Potassium-40	1.7E+01	pCi/g	--	--	NV	--	NV
	Radium-228	1.2E+00	pCi/g	--	--	NV	--	NV
	Thallium-208	3.5E-01	pCi/g	--	--	NV	--	NV
Dermal Absorption Route Total								0.07

TABLE 7.85
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Cradock Community Sediment
Exposure Medium: Sediment
Exposure Point: Cradock Community Sediment
Receptor Population: Resident
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Intake (Non-Cancer)		Reference Dose or Reference Concentration		Hazard Quotient
		Value	Units	Value	Units	Value	Units	
Inhalation								
	Aluminum	1.5E-05	mg/m^3	1.4E-05	mg/m^3	5.0E-03	mg/m^3	0.003
	Arsenic	1.1E-08	mg/m^3	1.0E-08	mg/m^3	1.5E-05	mg/m^3	0.001
	Cobalt	6.5E-08	mg/m^3	6.2E-08	mg/m^3	6.0E-06	mg/m^3	0.01
	Iron	3.0E-05	mg/m^3	2.9E-05	mg/m^3	NV	mg/m^3	NV
	Manganese	1.9E-07	mg/m^3	1.8E-07	mg/m^3	5.0E-05	mg/m^3	0.004
	Thallium	1.3E-09	mg/m^3	1.3E-09	mg/m^3	NV	mg/m^3	NV
	Vanadium	3.8E-08	mg/m^3	3.7E-08	mg/m^3	1.0E-04	mg/m^3	0.0004
	Mercury	7.9E-05	mg/m^3	7.6E-05	mg/m^3	3.0E-04	mg/m^3	0.3
	Bismuth-212	9.5E-10	pCi/L	--	--	NV	--	NV
	Bismuth-214	4.5E-10	pCi/L	--	--	NV	--	NV
	Lead-212	7.9E-10	pCi/L	--	--	NV	--	NV
	Lead-214	5.3E-10	pCi/L	--	--	NV	--	NV
	Potassium-40	1.2E-08	pCi/L	--	--	NV	--	NV
	Radium-228	8.9E-10	pCi/L	--	--	NV	--	NV
	Thallium-208	2.6E-10	pCi/L	--	--	NV	--	NV
Inhalation Route Total								0.3
							Total of Receptor Hazards Across All Media	1

Table 8.1
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.5a for mutagenic calculations				2.E-07
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.5a for mutagenic calculations				2.E-06
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.5a for mutagenic calculations				2.E-07
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	2.7E-06	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	4.E-08
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.5a for mutagenic calculations				5.E-07
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.5a for mutagenic calculations				1.E-07
	Aroclor 1248	4.7E+00	mg/kg	8.8E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-06
	Aroclor 1254	2.4E+00	mg/kg	4.5E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	9.E-07
	Aroclor 1260	6.2E+00	mg/kg	1.2E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-06
	High Risk PCB Congeners	1.2E+01	mg/kg	2.2E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.E-06
	Aluminum	9.6E+04	mg/kg	1.8E-02	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	6.5E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	1.7E-06	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-06
	Barium	4.3E+02	mg/kg	8.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	3.8E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	6.8E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.5a for mutagenic calculations				9.E-06
	Cobalt	1.6E+02	mg/kg	3.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	1.2E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	3.1E-02	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	6.7E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	1.8E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	1.9E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	4.8E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	1.5E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	1.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	pCi/g	4.4E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	6.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	pCi/g	9.6E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-05
	Bismuth-212	1.1E+00	pCi/g	--	--	8.3E+03	pCi/g	1.E-10
	Bismuth-214	2.1E+02	pCi/g	--	--	2.8E+00	pCi/g	7.E-05
	Cesium-137	1.0E-01	pCi/g	--	--	3.3E+02	pCi/g	3.E-10
	Lead-210	3.9E+02	pCi/g	--	--	2.8E+00	pCi/g	1.E-04
	Lead-212	8.1E-01	pCi/g	--	--	2.1E+02	pCi/g	4.E-09
	Lead-214	2.3E+02	pCi/g	--	--	2.8E+00	pCi/g	8.E-05
	Potassium-40	9.4E+00	pCi/g	--	--	2.4E+02	pCi/g	4.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.3E+00	pCi/g	1.E-06
	Radium-226	2.3E+00	pCi/g	--	--	2.4E+00	pCi/g	9.E-07
	Radium-228	8.8E-01	pCi/g	--	--	5.1E+00	pCi/g	2.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	2.3E+00	pCi/g	5.E-07
	Uranium-235	2.1E-01	pCi/g	--	--	9.5E+00	pCi/g	2.E-08
Ingestion Route Total								3.E-04

Table 8.1
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.5a for mutagenic calculations				6.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.5a for mutagenic calculations				5.E-07
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.5a for mutagenic calculations				7.E-08
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	6.3E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	9.E-09
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.5a for mutagenic calculations				2.E-07
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.5a for mutagenic calculations				4.E-08
	Aroclor 1248	4.7E+00	mg/kg	2.9E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Aroclor 1254	2.4E+00	mg/kg	1.5E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Aroclor 1260	6.2E+00	mg/kg	3.8E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-07
	High Risk PCB Congeners	1.2E+01	mg/kg	7.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Aluminum	9.6E+04	mg/kg	4.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	1.5E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	2.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Barium	4.3E+02	mg/kg	1.9E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	9.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	1.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.5a for mutagenic calculations				8.E-06
	Cobalt	1.6E+02	mg/kg	7.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	2.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	7.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	3.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	1.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	4.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	4.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	3.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	3.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	1.5E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	6.8E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-07
	Bismuth-212	1.1E+00	pCi/g	--	--	8.98E-01	pCi/g	1.E-06
	Bismuth-214	2.1E+02	pCi/g	--	--	8.49E-01	pCi/g	2.E-04
	Cesium-137	1.0E-01	pCi/g	--	--	2.41E+00	pCi/g	4.E-08
	Lead-210	3.9E+02	pCi/g	--	--	1.47E+03	pCi/g	3.E-07
	Lead-212	8.1E-01	pCi/g	--	--	8.41E-01	pCi/g	1.E-06
	Lead-214	2.3E+02	pCi/g	--	--	7.47E-01	pCi/g	3.E-04
	Potassium-40	9.4E+00	pCi/g	--	--	8.01E+00	pCi/g	1.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	7.36E-01	pCi/g	4.E-06
	Radium-226	2.3E+00	pCi/g	--	--	7.44E-01	pCi/g	3.E-06
	Radium-228	8.8E-01	pCi/g	--	--	5.44E-01	pCi/g	2.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	3.47E-01	pCi/g	8.E-07
	Thorium-234	1.1E+00	pCi/g	--	--	7.34E-01	pCi/g	2.E-06
	Uranium-235	2.1E-01	pCi/g	--	--	2.69E+00	pCi/g	8.E-08
Dermal Absorption Route Total								6.E-04

Table 8.1
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	See Table 8.5a for mutagenic calculations				3.E-10
	Benzo(a)pyrene	1.3E-09	mg/m^3	See Table 8.5a for mutagenic calculations				1.E-11
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	See Table 8.5a for mutagenic calculations				1.E-12
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	2.4E-11	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	6.E-14
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	See Table 8.5a for mutagenic calculations				3.E-12
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	See Table 8.5a for mutagenic calculations				6.E-13
	Aroclor 1248	6.9E-06	mg/m^3	1.6E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-09
	Aroclor 1254	2.6E-06	mg/m^3	6.2E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-09
	Aroclor 1260	4.4E-06	mg/m^3	1.0E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	6.E-09
	High Risk PCB Congeners	2.1E-05	mg/m^3	4.8E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-08
	Aluminum	7.1E-05	mg/m^3	1.7E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.5E-08	mg/m^3	6.0E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.1E-08	mg/m^3	2.5E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	1.E-10
	Barium	3.2E-07	mg/m^3	7.4E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cadmium	1.5E-08	mg/m^3	3.5E-11	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	6.E-11
	Chromium (Total)	2.6E-07	mg/m^3	6.2E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	See Table 8.5a for mutagenic calculations				1.E-08
	Cobalt	1.2E-07	mg/m^3	2.8E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	3.E-09
	Copper	4.8E-06	mg/m^3	1.1E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	1.2E-04	mg/m^3	2.8E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	5.0E-07	mg/m^3	1.2E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	2.6E-07	mg/m^3	6.2E-10	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	1.E-10
	Silver	7.2E-09	mg/m^3	1.7E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	7.6E-09	mg/m^3	1.8E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	1.9E-07	mg/m^3	4.4E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	5.7E-06	mg/m^3	1.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	8.2E-04	mg/m^3	1.9E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	1.1E-10	mg/m^3	2.6E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.E-08
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	5.7E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	2.E-08
	Bismuth-212	1.1E+00	pCi/g	--	--	2.0E+07	pCi/g	5.E-14
	Bismuth-214	2.1E+02	pCi/g	--	--	7.3E+04	pCi/g	3.E-09
	Cesium-137	1.0E-01	pCi/g	--	--	2.0E+07	pCi/g	5.E-15
	Lead-210	3.9E+02	pCi/g	--	--	7.4E+04	pCi/g	5.E-09
	Lead-212	8.1E-01	pCi/g	--	--	3.1E+06	pCi/g	3.E-13
	Lead-214	2.3E+02	pCi/g	--	--	7.3E+04	pCi/g	3.E-09
	Potassium-40	9.4E+00	pCi/g	--	--	1.0E+07	pCi/g	9.E-13
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.9E+04	pCi/g	1.E-10
	Radium-226	2.3E+00	pCi/g	--	--	3.8E+04	pCi/g	6.E-11
	Radium-228	8.8E-01	pCi/g	--	--	1.2E+04	pCi/g	7.E-11
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.9E+04	pCi/g	6.E-11
	Uranium-235	2.1E-01	pCi/g	--	--	7.2E+03	pCi/g	3.E-11
Inhalation Route Total								1.E-07
							Total of Receptor Risks Across All Media	9.E-04

Table 8.1a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor Value	Cancer Slope Factor Units	Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
Benzo(a)anthracene	Ingestion									2.E-07
	Age 0 -2 years	1.9E+00	mg/kg	1.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	1.9E+00	mg/kg	2.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.E-08	
	Dermal Absorption									6.E-08
	Age 0 -2 years	1.9E+00	mg/kg	3.7E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-08	
	Age 2 - 6 years	1.9E+00	mg/kg	7.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Inhalation									3.E-10
	Age 0 -2 years	4.0E-07	mg/m3	3.1E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	2.E-10	
	Age 2 - 6 years	4.0E-07	mg/m3	6.3E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-10	
Benzo(a)pyrene	Ingestion									2.E-06
	Age 0 -2 years	1.7E+00	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.E-06	
	Age 2 - 6 years	1.7E+00	mg/kg	2.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	6.E-07	
	Dermal Absorption									5.E-07
	Age 0 -2 years	1.7E+00	mg/kg	3.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	3.E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	6.7E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Inhalation									1.E-11
	Age 0 -2 years	1.3E-09	mg/m3	9.9E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	6.E-12	
	Age 2 - 6 years	1.3E-09	mg/m3	2.0E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	4.E-12	
Benzo(b)fluoranthene	Ingestion									2.E-07
	Age 0 -2 years	2.2E+00	mg/kg	1.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	2.2E+00	mg/kg	2.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	8.E-08	
	Dermal Absorption									7.E-08
	Age 0 -2 years	2.2E+00	mg/kg	4.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	8.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Inhalation									1.E-12
	Age 0 -2 years	1.6E-09	mg/m3	1.2E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	7.E-13	
	Age 2 - 6 years	1.6E-09	mg/m3	2.5E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	4.E-13	

Table 8.1a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor Value	Cancer Slope Factor Units	Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
Dibenzo(a.h)anthracene	Ingestion									5.E-07
	Age 0 -2 years	5.3E-01	mg/kg	3.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	3.E-07	
	Age 2 - 6 years	5.3E-01	mg/kg	6.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Dermal Absorption									2.E-07
	Age 0 -2 years	5.3E-01	mg/kg	1.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	5.3E-01	mg/kg	2.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	6.E-08	
	Inhalation									3.E-12
	Age 0 -2 years	3.9E-10	mg/m3	3.0E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	2.E-12	
	Age 2 - 6 years	3.9E-10	mg/m3	6.1E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	1.E-12	
Indeno(1,2,3-c,d)pyrene	Ingestion									1.E-07
	Age 0 -2 years	1.2E+00	mg/kg	7.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	7.E-08	
	Age 2 - 6 years	1.2E+00	mg/kg	1.5E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-08	
	Dermal Absorption									4.E-08
	Age 0 -2 years	1.2E+00	mg/kg	2.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-08	
	Age 2 - 6 years	1.2E+00	mg/kg	4.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-08	
	Inhalation									6.E-13
	Age 0 -2 years	8.6E-10	mg/m3	6.8E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	4.E-13	
	Age 2 - 6 years	8.6E-10	mg/m3	1.4E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-13	
Chromium	Ingestion									9.E-06
	Age 0 -2 years	1.8E+01	mg/kg	1.1E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	6.E-06	
	Age 2 - 6 years	1.8E+01	mg/kg	2.2E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.E-06	
	Dermal Absorption									8.E-06
	Age 0 -2 years	1.8E+01	mg/kg	2.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	5.E-06	
	Age 2 - 6 years	1.8E+01	mg/kg	5.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.E-06	
	Inhalation									1.E-08
	Age 0 -2 years	1.3E-08	mg/m3	1.0E-11	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	10	9.E-09	
	Age 2 - 6 years	1.3E-08	mg/m3	2.0E-11	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	5.E-09	

Table 8.2
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.6a for mutagenic calculations				2.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.6a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.6a for mutagenic calculations				2.E-08
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	5.5E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	8.E-09
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.6a for mutagenic calculations				5.E-08
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.6a for mutagenic calculations				1.E-08
	Aroclor 1248	4.7E+00	mg/kg	1.8E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.E-07
	Aroclor 1254	2.4E+00	mg/kg	9.3E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-07
	Aroclor 1260	6.2E+00	mg/kg	2.4E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.E-07
	High Risk PCB Congeners	1.2E+01	mg/kg	4.6E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	9.E-07
	Aluminum	9.6E+04	mg/kg	3.7E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	3.4E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	5.E-07
	Barium	4.3E+02	mg/kg	1.7E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	7.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.6a for mutagenic calculations				9.E-07
	Cobalt	1.6E+02	mg/kg	6.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	2.5E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	6.4E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	2.6E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	3.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	4.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	1.0E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	3.0E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	3.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	pCi/g	9.2E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	pCi/g	2.0E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-06
	Bismuth-212	1.1E+00	pCi/g	--	--	1.1E+04	pCi/g	1.E-10
	Bismuth-214	2.1E+02	pCi/g	--	--	3.7E+00	pCi/g	6.E-05
	Cesium-137	1.0E-01	pCi/g	--	--	4.4E+02	pCi/g	2.E-10
	Lead-210	3.9E+02	pCi/g	--	--	3.7E+00	pCi/g	1.E-04
	Lead-212	8.1E-01	pCi/g	--	--	2.9E+02	pCi/g	3.E-09
	Lead-214	2.3E+02	pCi/g	--	--	3.7E+00	pCi/g	6.E-05
	Potassium-40	9.4E+00	pCi/g	--	--	3.2E+02	pCi/g	3.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	3.1E+00	pCi/g	9.E-07
	Radium-226	2.3E+00	pCi/g	--	--	3.3E+00	pCi/g	7.E-07
	Radium-228	8.8E-01	pCi/g	--	--	6.8E+00	pCi/g	1.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	3.1E+00	pCi/g	4.E-07
	Uranium-235	2.1E-01	pCi/g	--	--	1.3E+01	pCi/g	2.E-08
Ingestion Route Total								2.E-04

Table 8.2
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.6a for mutagenic calculations				5.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.6a for mutagenic calculations				5.E-07
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.6a for mutagenic calculations				6.E-08
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	1.1E-06	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	2.E-08
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.6a for mutagenic calculations				1.E-07
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.6a for mutagenic calculations				3.E-08
	Aroclor 1248	4.7E+00	mg/kg	5.2E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-06
	Aroclor 1254	2.4E+00	mg/kg	2.7E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.E-07
	Aroclor 1260	6.2E+00	mg/kg	6.8E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-06
	High Risk PCB Congeners	1.2E+01	mg/kg	1.3E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-06
	Aluminum	9.6E+04	mg/kg	7.6E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	2.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	3.5E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	5.E-07
	Barium	4.3E+02	mg/kg	3.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	2.8E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.6a for mutagenic calculations				7.E-06
	Cobalt	1.6E+02	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	5.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	1.3E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	5.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	2.8E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	7.7E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	8.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	2.0E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	6.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	6.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	2.6E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	1.2E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-06
	Bismuth-212	1.1E+00	pCi/g	--	--	5.98E-01	pCi/g	2.E-06
	Bismuth-214	2.1E+02	pCi/g	--	--	5.66E-01	pCi/g	4.E-04
	Cesium-137	1.0E-01	pCi/g	--	--	1.61E+00	pCi/g	6.E-08
	Lead-210	3.9E+02	pCi/g	--	--	9.80E+02	pCi/g	4.E-07
	Lead-212	8.1E-01	pCi/g	--	--	5.61E-01	pCi/g	1.E-06
	Lead-214	2.3E+02	pCi/g	--	--	4.98E-01	pCi/g	5.E-04
	Potassium-40	9.4E+00	pCi/g	--	--	5.34E+00	pCi/g	2.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	4.90E-01	pCi/g	6.E-06
	Radium-226	2.3E+00	pCi/g	--	--	4.96E-01	pCi/g	5.E-06
	Radium-228	8.8E-01	pCi/g	--	--	3.63E-01	pCi/g	2.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	2.32E-01	pCi/g	1.E-06
	Thorium-234	1.1E+00	pCi/g	--	--	4.89E-01	pCi/g	2.E-06
	Uranium-235	2.1E-01	pCi/g	--	--	1.79E+00	pCi/g	1.E-07
Dermal Absorption Route Total								9.E-04

Table 8.2
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Value	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Units	Cancer Risk
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	See Table 8.6a for mutagenic calculations				2.E-10
	Benzo(a)pyrene	1.3E-09	mg/m^3	See Table 8.6a for mutagenic calculations				7.E-12
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	See Table 8.6a for mutagenic calculations				9.E-13
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	3.7E-11	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	9.E-14
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	See Table 8.6a for mutagenic calculations				2.E-12
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	See Table 8.6a for mutagenic calculations				5.E-13
	Aroclor 1248	6.9E-06	mg/m^3	2.4E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-08
	Aroclor 1254	2.6E-06	mg/m^3	9.3E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.E-09
	Aroclor 1260	4.4E-06	mg/m^3	1.5E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-09
	High Risk PCB Congeners	2.1E-05	mg/m^3	7.2E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-08
	Aluminum	7.1E-05	mg/m^3	2.5E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.5E-08	mg/m^3	8.9E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.1E-08	mg/m^3	3.8E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	2.E-10
	Barium	3.2E-07	mg/m^3	1.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cadmium	1.5E-08	mg/m^3	5.2E-11	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	9.E-11
	Chromium (Total)	2.6E-07	mg/m^3	9.3E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	See Table 8.6a for mutagenic calculations				1.E-08
	Cobalt	1.2E-07	mg/m^3	4.2E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	4.E-09
	Copper	4.8E-06	mg/m^3	1.7E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	1.2E-04	mg/m^3	4.3E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	5.0E-07	mg/m^3	1.8E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	2.6E-07	mg/m^3	9.3E-10	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	2.E-10
	Silver	7.2E-09	mg/m^3	2.5E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	7.6E-09	mg/m^3	2.7E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	1.9E-07	mg/m^3	6.7E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	5.7E-06	mg/m^3	2.0E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	8.2E-04	mg/m^3	2.9E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	1.1E-10	mg/m^3	3.9E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.E-08
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	8.6E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	3.E-08
	Bismuth-212	1.1E+00	pCi/g	--	--	6.7E+06	pCi/g	2.E-13
	Bismuth-214	2.1E+02	pCi/g	--	--	2.4E+04	pCi/g	8.E-09
	Cesium-137	1.0E-01	pCi/g	--	--	6.7E+06	pCi/g	2.E-14
	Lead-210	3.9E+02	pCi/g	--	--	2.5E+04	pCi/g	2.E-08
	Lead-212	8.1E-01	pCi/g	--	--	1.0E+06	pCi/g	8.E-13
	Lead-214	2.3E+02	pCi/g	--	--	2.4E+04	pCi/g	9.E-09
	Potassium-40	9.4E+00	pCi/g	--	--	3.4E+06	pCi/g	3.E-12
	Protactinium-234M	2.7E+00	pCi/g	--	--	6.2E+03	pCi/g	4.E-10
	Radium-226	2.3E+00	pCi/g	--	--	1.3E+04	pCi/g	2.E-10
	Radium-228	8.8E-01	pCi/g	--	--	4.0E+03	pCi/g	2.E-10
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	6.2E+03	pCi/g	2.E-10
	Uranium-235	2.1E-01	pCi/g	--	--	2.4E+03	pCi/g	9.E-11
Inhalation Route Total								2.E-07
							Total of Receptor Risks Across All Media	1.E-03

Table 8.2a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									2.E-08
	Age 9 - 16 years	1.9E+00	mg/kg	5.7E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 18 years	1.9E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-09	
	Dermal Absorption									5.E-08
	Age 9 - 16 years	1.9E+00	mg/kg	1.5E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 18 years	1.9E+00	mg/kg	4.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	4.E-09	
	Inhalation									2.E-10
	Age 9 - 16 years	4.0E-07	mg/m3	1.1E-09	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-10	
	Age 16 - 18 years	4.0E-07	mg/m3	3.1E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	2.E-11	
Benzo(a)pyrene	Ingestion									2.E-07
	Age 9 - 16 years	1.7E+00	mg/kg	5.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 18 years	1.7E+00	mg/kg	1.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.E-08	
	Dermal Absorption									5.E-07
	Age 9 - 16 years	1.7E+00	mg/kg	1.4E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	4.E-07	
	Age 16 - 18 years	1.7E+00	mg/kg	3.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	4.E-08	
	Inhalation									7.E-12
	Age 9 - 16 years	1.3E-09	mg/m3	3.5E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	6.E-12	
	Age 16 - 18 years	1.3E-09	mg/m3	9.9E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	6.E-13	
Benzo(b)fluoranthene	Ingestion									2.E-08
	Age 9 - 16 years	2.2E+00	mg/kg	6.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 18 years	2.2E+00	mg/kg	1.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-09	
	Dermal Absorption									6.E-08
	Age 9 - 16 years	2.2E+00	mg/kg	1.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 18 years	2.2E+00	mg/kg	4.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	5.E-09	
	Inhalation									9.E-13
	Age 9 - 16 years	1.6E-09	mg/m3	4.4E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	8.E-13	
	Age 16 - 18 years	1.6E-09	mg/m3	1.2E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	7.E-14	

Table 8.2a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Dibenzo(a.h)anthracene	Ingestion									5.E-08
	Age 9 - 16 years	5.3E-01	mg/kg	1.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 18 years	5.3E-01	mg/kg	4.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.E-09	
	Dermal Absorption									1.E-07
	Age 9 - 16 years	5.3E-01	mg/kg	4.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-07	
	Age 16 - 18 years	5.3E-01	mg/kg	1.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.E-08	
	Inhalation									2.E-12
	Age 9 - 16 years	3.9E-10	mg/m3	1.1E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	2.E-12	
	Age 16 - 18 years	3.9E-10	mg/m3	3.0E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	2.E-13	
Indeno(1,2,3-c,d)pyrene	Ingestion									1.E-08
	Age 9 - 16 years	1.2E+00	mg/kg	3.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-08	
	Age 16 - 18 years	1.2E+00	mg/kg	1.0E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-09	
	Dermal Absorption									3.E-08
	Age 9 - 16 years	1.2E+00	mg/kg	9.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Age 16 - 18 years	1.2E+00	mg/kg	2.7E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	3.E-09	
	Inhalation									5.E-13
	Age 9 - 16 years	8.6E-10	mg/m3	2.4E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	4.E-13	
	Age 16 - 18 years	8.6E-10	mg/m3	6.8E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	4.E-14	
Chromium	Ingestion									9.E-07
	Age 9 - 16 years	1.8E+01	mg/kg	5.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	8.E-07	
	Age 16 - 18 years	1.8E+01	mg/kg	1.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	8.E-08	
	Dermal Absorption									7.E-06
	Age 9 - 16 years	1.8E+01	mg/kg	1.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	7.E-06	
	Age 16 - 18 years	1.8E+01	mg/kg	3.1E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	6.E-07	
	Inhalation									1.E-08
	Age 9 - 16 years	1.3E-08	mg/m3	3.6E-11	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	9.E-09	
	Age 16 - 18 years	1.3E-08	mg/m3	1.0E-11	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	1	9.E-10	

Table 8.3
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Site Visitor/Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	1.1E-07	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	1.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	1.0E-07	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	1.E-07
	Benzo(b)fluoranthene	2.2E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	1.E-08
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	8.3E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	1.E-08
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	3.1E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	3.E-08
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	6.9E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	7.E-09
	Aroclor 1248	4.7E+00	mg/kg	2.7E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.E-07
	Aroclor 1254	2.4E+00	mg/kg	1.4E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-07
	Aroclor 1260	6.2E+00	mg/kg	3.6E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	7.E-07
	High Risk PCB Congeners	1.2E+01	mg/kg	6.9E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-06
	Aluminum	9.6E+04	mg/kg	5.6E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	2.0E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	5.2E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	8.E-07
	Barium	4.3E+02	mg/kg	2.5E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	2.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	1.0E-06	mg/kg-day	5.0E-01	$(mg/kg-day)^{-1}$	5.E-07
	Cobalt	1.6E+02	mg/kg	9.6E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	3.8E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	9.7E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	4.0E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	2.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	5.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	6.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	1.5E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	4.5E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	4.5E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	1.4E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	3.0E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	4.E-06
	Bismuth-212	1.1E+00	pCi/g	--	--	4.96E+03	pCi/g	2.E-10
	Bismuth-214	2.1E+02	pCi/g	--	--	1.66E+00	pCi/g	1.E-04
	Cesium-137	1.0E-01	pCi/g	--	--	1.96E+02	pCi/g	5.E-10
	Lead-210	3.9E+02	pCi/g	--	--	1.66E+00	pCi/g	2.E-04
	Lead-212	8.1E-01	pCi/g	--	--	1.28E+02	pCi/g	6.E-09
	Lead-214	2.3E+02	pCi/g	--	--	1.66E+00	pCi/g	1.E-04
	Potassium-40	9.4E+00	pCi/g	--	--	1.43E+02	pCi/g	7.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.39E+00	pCi/g	2.E-06
	Radium-226	2.3E+00	pCi/g	--	--	1.46E+00	pCi/g	2.E-06
	Radium-228	8.8E-01	pCi/g	--	--	3.07E+00	pCi/g	3.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.37E+00	pCi/g	8.E-07
	Uranium-235	2.1E-01	pCi/g	--	--	5.67E+00	pCi/g	4.E-08
Ingestion Route Total								5.E-04

Table 8.3
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Site Visitor/Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	6.1E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	6.E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	5.6E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	6.E-08
	Benzo(b)fluoranthene	2.2E+00	mg/kg	7.0E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	7.E-09
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	3.5E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	5.E-09
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	1.7E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	2.E-08
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	3.8E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	4.E-09
	Aroclor 1248	4.7E+00	mg/kg	1.6E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-07
	Aroclor 1254	2.4E+00	mg/kg	8.3E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-07
	Aroclor 1260	6.2E+00	mg/kg	2.1E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.E-07
	High Risk PCB Congeners	1.2E+01	mg/kg	4.1E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	8.E-07
	Aluminum	9.6E+04	mg/kg	2.4E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	8.6E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-07
	Barium	4.3E+02	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	5.0E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	8.9E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	4.4E-08	mg/kg-day	2.0E+01	$(mg/kg-day)^{-1}$	9.E-07
	Cobalt	1.6E+02	mg/kg	4.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	4.1E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	1.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	8.9E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	2.4E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	2.6E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	6.4E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	1.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	1.9E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	8.2E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-06
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	3.8E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-07
	Bismuth-212	1.1E+00	pCi/g	--	--	2.69E-01	pCi/g	4.E-06
	Bismuth-214	2.1E+02	pCi/g	--	--	2.55E-01	pCi/g	8.E-04
	Cesium-137	1.0E-01	pCi/g	--	--	7.22E-01	pCi/g	1.E-07
	Lead-210	3.9E+02	pCi/g	--	--	4.41E+02	pCi/g	9.E-07
	Lead-212	8.1E-01	pCi/g	--	--	2.52E-01	pCi/g	3.E-06
	Lead-214	2.3E+02	pCi/g	--	--	2.24E-01	pCi/g	1.E-03
	Potassium-40	9.4E+00	pCi/g	--	--	2.40E+00	pCi/g	4.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.21E-01	pCi/g	1.E-05
	Radium-226	2.3E+00	pCi/g	--	--	2.23E-01	pCi/g	1.E-05
	Radium-228	8.8E-01	pCi/g	--	--	1.63E-01	pCi/g	5.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	1.04E-01	pCi/g	3.E-06
	Thorium-234	1.1E+00	pCi/g	--	--	2.20E-01	pCi/g	5.E-06
	Uranium-235	2.1E-01	pCi/g	--	--	8.08E-01	pCi/g	3.E-07
Dermal Absorption Route Total								2.E-03

Table 8.3
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site Surface Soil
Receptor Population: Recreational User/Fisherman/Site Visitor/Trespasser
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	3.1E-09	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	2.E-10
	Benzo(a)pyrene	1.3E-09	mg/m^3	9.9E-12	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	6.E-12
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	1.2E-11	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	7.E-13
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	8.1E-11	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	2.E-13
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	3.0E-12	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	2.E-12
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	6.8E-12	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	4.E-13
	Aroclor 1248	6.9E-06	mg/m^3	5.4E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-08
	Aroclor 1254	2.6E-06	mg/m^3	2.1E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-08
	Aroclor 1260	4.4E-06	mg/m^3	3.4E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.E-08
	High Risk PCB Congeners	2.1E-05	mg/m^3	1.6E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-08
	Aluminum	7.1E-05	mg/m^3	5.5E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.5E-08	mg/m^3	2.0E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.1E-08	mg/m^3	8.5E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	4.E-10
	Barium	3.2E-07	mg/m^3	2.5E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cadmium	1.5E-08	mg/m^3	1.2E-10	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	2.E-10
	Chromium (Total)	2.6E-07	mg/m^3	2.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	1.0E-10	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	9.E-09
	Cobalt	1.2E-07	mg/m^3	9.4E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	8.E-09
	Copper	4.8E-06	mg/m^3	3.8E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	1.2E-04	mg/m^3	9.5E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	5.0E-07	mg/m^3	3.9E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	2.6E-07	mg/m^3	2.1E-09	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	5.E-10
	Silver	7.2E-09	mg/m^3	5.6E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	7.6E-09	mg/m^3	5.9E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	1.9E-07	mg/m^3	1.5E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	5.7E-06	mg/m^3	4.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	8.2E-04	mg/m^3	6.4E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	1.1E-10	mg/m^3	8.8E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	3.E-08
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	1.9E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	7.E-08
	Bismuth-212	1.1E+00	pCi/g	--	--	3.01E+06	pCi/g	4.E-13
	Bismuth-214	2.1E+02	pCi/g	--	--	1.10E+04	pCi/g	2.E-08
	Cesium-137	1.0E-01	pCi/g	--	--	3.02E+06	pCi/g	3.E-14
	Lead-210	3.9E+02	pCi/g	--	--	1.10E+04	pCi/g	4.E-08
	Lead-212	8.1E-01	pCi/g	--	--	4.58E+05	pCi/g	2.E-12
	Lead-214	2.3E+02	pCi/g	--	--	1.10E+04	pCi/g	2.E-08
	Potassium-40	9.4E+00	pCi/g	--	--	1.53E+06	pCi/g	6.E-12
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.81E+03	pCi/g	1.E-09
	Radium-226	2.3E+00	pCi/g	--	--	5.75E+03	pCi/g	4.E-10
	Radium-228	8.8E-01	pCi/g	--	--	1.81E+03	pCi/g	5.E-10
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	2.81E+03	pCi/g	4.E-10
	Uranium-235	2.1E-01	pCi/g	--	--	1.08E+03	pCi/g	2.E-10
Inhalation Route Total								4.E-07
							Total of Receptor Risks Across All Media	2.E-03

Table 8.4

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	1.5E-07	mg/kg-day	NV	mg/kg-day	NV
				Mercury	6.0E-05	mg/m^3	1.4E-07	mg/kg-day	NV	mg/kg-day	NV
				Vinyl chloride	5.8E-03	mg/m^3	1.4E-05	mg/kg-day	4.4E-03	mg/kg-day	6.E-08
			Exp. Route Total								6.E-08
	Exposure Medium Total										6.E-08
Groundwater Total											6.E-08

Table 8.5

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	2.2E-07	mg/kg-day	NV	mg/kg-day	NV
				Mercury	6.0E-05	mg/m^3	2.1E-07	mg/kg-day	NV	mg/kg-day	NV
				Vinyl chloride	5.8E-03	mg/m^3	2.0E-05	mg/kg-day	4.4E-03	mg/kg-day	9.E-08
			Exp. Route Total								9.E-08
	Exposure Medium Total										9.E-08
Groundwater Total											9.E-08

Table 8.6

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Trespasser (Current/Future)/Visitor (Future)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	5.0E-07	mg/kg-day	NV	mg/kg-day	NV
				Mercury	6.0E-05	mg/m^3	4.7E-07	mg/kg-day	NV	mg/kg-day	NV
				Vinyl chloride	5.8E-03	mg/m^3	4.5E-05	mg/kg-day	4.4E-03	mg/kg-day	2.E-07
			Exp. Route Total								2.E-07
	Exposure Medium Total										2.E-07
Groundwater Total											2.E-07

Table 8.7

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Tap	Ingestion	Aluminum	8.0E-01	mg/L	1.0E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Antimony	1.9E-02	mg/L	2.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Arsenic	1.4E-02	mg/L	1.8E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-04
				Barium	3.2E-01	mg/L	4.2E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cadmium	7.5E-04	mg/L	9.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Trivalent)	4.4E-03	mg/L	5.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Hexavalent)	1.2E-02	mg/L	See Table for Mutagenic Risks				2.E-04
				Cobalt	4.8E-02	mg/L	6.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	1.8E+01	mg/L	2.2E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Manganese	3.9E-01	mg/L	5.0E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Mercury	1.7E-04	mg/L	2.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Nickel	2.1E-02	mg/L	2.7E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Selenium	8.5E-03	mg/L	1.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	1.1E-02	mg/L	1.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vanadium	3.6E-03	mg/L	4.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Naphthalene	1.3E-03	mg/L	1.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chlorobenzene	4.1E-02	mg/L	5.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				cis-1,2-Dichloroethene	9.3E-03	mg/L	1.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vinyl chloride	5.1E-03	mg/L	See Table for Vinyl Chloride				2.E-04
				1,4-Dichlorobenzene	2.3E-03	mg/L	3.0E-05	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Cyanide	1.5E-02	mg/L	2.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	1.2E-10	mg/L	1.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
				High Risk PCBs	5.8E-05	mg/L	7.4E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	5.9E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-06
				Bismuth-214	1.0E+01	pCi/L	--	--	2.0E-02	pCi/L	5.E-04
				Lead-210	3.2E+01	pCi/L	--	--	2.0E-02	pCi/L	2.E-03
				Lead-212	3.3E+00	pCi/L	--	--	2.0E+00	pCi/L	2.E-06
				Lead-214	7.9E+00	pCi/L	--	--	2.0E-02	pCi/L	4.E-04
				Potassium-40	4.0E+01	pCi/L	--	--	2.1E+00	pCi/L	2.E-05
				Radium-226	1.0E+02	pCi/L	--	--	1.7E-02	pCi/L	6.E-03
				Radium-228	5.7E+00	pCi/L	--	--	3.9E-02	pCi/L	1.E-04
				Strontium-90	1.5E+00	pCi/L	--	--	7.1E-01	pCi/L	2.E-06
			Exp. Route Total								9.E-03

Table 8.7

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Shower	Dermal contact	Aluminum	8.0E-01	mg/L	5.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Antimony	1.9E-02	mg/L	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Arsenic	1.4E-02	mg/L	9.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
				Barium	3.2E-01	mg/L	2.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cadmium	7.5E-04	mg/L	5.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Trivalent)	4.4E-03	mg/L	2.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Hexavalent)	1.2E-02	mg/L	See Table for Mutagenic Risks				1.E-04
				Cobalt	4.8E-02	mg/L	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	1.8E+01	mg/L	1.2E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Manganese	3.9E-01	mg/L	2.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Mercury	1.7E-04	mg/L	1.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Nickel	2.1E-02	mg/L	1.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Selenium	8.5E-03	mg/L	5.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	1.1E-02	mg/L	7.0E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vanadium	3.6E-03	mg/L	2.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Naphthalene	1.3E-03	mg/L	1.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chlorobenzene	4.1E-02	mg/L	1.8E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				cis-1,2-Dichloroethene	9.3E-03	mg/L	9.9E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vinyl chloride	5.1E-03	mg/L	See Table for Vinyl Chloride				1.E-05
				1,4-Dichlorobenzene	2.3E-03	mg/L	1.9E-05	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Cyanide	1.5E-02	mg/L	1.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	1.2E-10	mg/L	7.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-06
				High Risk PCBs	5.8E-05	mg/L	7.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	1.1E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-04
				Bismuth-214	1.0E+01	pCi/L	--	--	9.9E+04	pCi/L	1.E-10
				Lead-210	3.2E+01	pCi/L	--	--	8.4E+07	pCi/L	4.E-13
				Lead-212	3.3E+00	pCi/L	--	--	9.8E+04	pCi/L	3.E-11
				Lead-214	7.9E+00	pCi/L	--	--	8.6E+04	pCi/L	9.E-11
				Potassium-40	4.0E+01	pCi/L	--	--	9.2E+05	pCi/L	4.E-11
				Radium-226	1.0E+02	pCi/L	--	--	8.5E+04	pCi/L	1.E-09
				Radium-228	5.7E+00	pCi/L	--	--	6.3E+04	pCi/L	9.E-11
				Strontium-90	1.5E+00	pCi/L	--	--	3.6E+07	pCi/L	4.E-14
			Exp. Route Total								3.E-04
	Exposure Medium Total										1.E-02
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	2.3E-05	mg/kg-day	NV	mg/kg-day	NV
				Mercury	6.0E-05	mg/m^3	2.1E-05	mg/kg-day	NV	mg/kg-day	NV
				Vinyl chloride	5.8E-03	mg/m^3	2.1E-03	mg/kg-day	4.4E-03	mg/kg-day	9.E-06
			Exp. Route Total								9.E-06
	Exposure Medium Total										9.E-06
Groundwater Total											1.E-02

Table 8.7a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	1.2E-02	mg/L	1.8E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	9.E-05	2.E-04
	Age 2 - 6 years	1.2E-02	mg/L	3.6E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.E-05	
	Age 6 - 16 years	1.2E-02	mg/L	5.3E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	8.E-05	
	Age 16 - 26 years	1.2E-02	mg/L	5.3E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	3.E-05	
	Dermal Absorption									
	Age 0 -2 years	1.2E-02	mg/L	1.6E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-05	1.E-04
	Age 2 - 6 years	1.2E-02	mg/L	3.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	
	Age 6 - 16 years	1.2E-02	mg/L	6.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.E-05	
	Age 16 - 26 years	1.2E-02	mg/L	6.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.E-05	

Table 8.7b
CALCULATION OF CANCER RISKS FOR VINYL CHLORIDE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Lifetime, Age-Adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)	Cancer Slope Factor			Cancer Risk
				Value	Units	Value	Units	
Ingestion	Vinyl Chloride - total ingestion							2.E-04
	Child, Pro-rated	5.1E-03	mg/L	2.2E-05	mg/kg-day	7.2E-01	(mg/kg-day)-1	2.E-05
	Child, non-pro-rated	5.1E-03	mg/L	2.7E-04	mg/kg-day	7.2E-01	(mg/kg-day)-1	2.E-04
	Adult, pro-rated	5.1E-03	mg/L	4.4E-05	mg/kg-day	7.2E-01	(mg/kg-day)-1	3.E-05
Dermal Absorption	Vinyl Chloride - total dermal							1.E-05
	Child, Pro-rated	5.1E-03	mg/L	9.9E-07	mg/kg-day	7.2E-01	(mg/kg-day)-1	7.E-07
	Child, non-pro-rated	5.1E-03	mg/L	1.2E-05	mg/kg-day	7.2E-01	(mg/kg-day)-1	9.E-06
	Adult, pro-rated	5.1E-03	mg/L	2.3E-06	mg/kg-day	7.2E-01	(mg/kg-day)-1	2.E-06
								2.E-04

Carcinogenic risks associated with vinyl chloride calculated using methodology and equations from USEPA's RSL Table User Guide, and incorporate MMOA.

Table 8.8
NON-CANCER HAZARDS AND CANCER RISKS, INHALATION PATHWAY FOR ADULT RESIDENTS SHOWERING
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Chemical	Molecular Weight	k_l (cm/hr)	k_g (cm/hr)	HLC (atm-m^3/mol)	K_L (cm/hr)	K_{aL} (cm/hr)	Cw (ug/L)	Cwd (ug/L)	S (ug/m^3-min)	Ca (mg/m^3)	ET (hr/day)	Adjusted Ca for cancer risk (mg/m^3)	IUR (mg/m^3)$^{-1}$	Cancer Risk
Naphthalene	128.17	11.71826032	1124.253673	4.40E-04	7.467897706	10.08762295	1.30E+00	0.104815293	0.087346078	0.005239717	0.1832074	1.09584E-05	3.4E-02	4.E-07
1,4-Dichlorobenzene	147	10.94202409	1049.781318	2.43E-03	9.919734209	13.39955934	2.30E+00	0.243005106	0.202504255	0.012147826	0.1832074	2.54061E-05	1.1E-02	3.E-07
Chlorobenzene	112.56	12.50444129	1199.680128	3.11E-03	11.57258232	15.63222363	4.10E+01	5.007753638	4.173128032	0.250337614	0.1832074	0.000523558	NV	NV
cis-1,2-Dichloroethene	96.944	13.47397901	1292.697889	4.08E-03	12.6947852	17.14809329	9.29E+00	1.236656226	1.030546855	0.061820447	0.1832074	0.000129292	NV	NV
Vinyl chloride	62.499	16.78107582	1609.981824	2.78E-02	16.63125898	22.46547508	5.10E+00	0.87073488	0.7256124	0.043528038	0.1832074	9.10349E-05	4.4E-03	4.E-07
High Risk PCBs	291.99	7.763764348	744.8580543	4.15E-04	4.84195048	6.540498105	5.77E-02	0.003060721	0.002550601	0.000153005	0.1832074	3.19997E-07	5.7E-01	2.E-07
Dioxin-like PCBs	360.88	6.983528773	670.0020017	1.43E-04	2.538325689	3.428765831	1.15E-07	3.24701E-09	2.70584E-09	1.62318E-10	0.1832074	3.39473E-13	3.8E+04	1.E-08
2,3,7,8-TCDD	321.98	7.393360551	709.3213946	5.00E-05	1.230477393	1.662126676	4.58E-06	6.30528E-08	5.2544E-08	3.15201E-09	0.1832074	6.59214E-12	3.8E+04	3.E-07
Cyanide	26.018	26.00874395	2495.287279	1.01E-04	7.47491459	10.09710135	1.53E+01	1.237934377	1.031611981	0.061884342	0.1832074	0.000129425	NV	NV

Table 8.8a

CALCULATION OF CHEMICAL HAZARDS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Screening value		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Tap	Inhalation	Bismuth-214	1.0E+01	pCi/L	--	--	NV	pCi/L	NV
				Lead-210	3.2E+01	pCi/L	--	--	NV	pCi/L	NV
				Lead-212	3.3E+00	pCi/L	--	--	NV	pCi/L	NV
				Lead-214	7.9E+00	pCi/L	--	--	NV	pCi/L	NV
				Potassium-40	4.0E+01	pCi/L	--	--	NV	pCi/L	NV
				Radium-226	1.0E+02	pCi/L	--	--	4.4E-04	pCi/L	2.E-01
				Radium-228	5.7E+00	pCi/L	--	--	1.1E-03	pCi/L	5.E-03
				Strontium-90	1.5E+00	pCi/L	--	--	NV	pCi/L	NV
			Exp. Route Total								2.E-01
	Exposure Medium Total										2.E-01

Table 8.9

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Site Groundwater
Exposure Point: Site Groundwater
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Utility Trench	Dermal contact	Aluminum	8.0E-01	mg/L	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Antimony	1.9E-02	mg/L	2.7E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Arsenic	1.4E-02	mg/L	2.0E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
				Barium	3.2E-01	mg/L	4.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cadmium	7.5E-04	mg/L	1.0E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Trivalent)	4.4E-03	mg/L	6.1E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chromium (Hexavalent)	1.2E-02	mg/L	3.4E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	7.E-08
				Cobalt	4.8E-02	mg/L	2.7E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	1.8E+01	mg/L	2.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Manganese	3.9E-01	mg/L	5.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Mercury	1.7E-04	mg/L	2.3E-11	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Nickel	2.1E-02	mg/L	2.9E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Selenium	8.5E-03	mg/L	1.2E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	1.1E-02	mg/L	1.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vanadium	3.6E-03	mg/L	5.0E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Naphthalene	1.3E-03	mg/L	9.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Chlorobenzene	4.1E-02	mg/L	1.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				cis-1,2-Dichloroethene	9.3E-03	mg/L	1.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Vinyl chloride	5.1E-03	mg/L	4.4E-09	mg/kg-day	7.2E-01	$(mg/kg\text{-}day)^{-1}$	3.E-09
				1,4-Dichlorobenzene	2.3E-03	mg/L	1.7E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	9.E-11
				Cyanide	1.5E-02	mg/L	2.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	1.2E-10	mg/L	6.1E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-09
				High Risk PCBs	5.8E-05	mg/L	6.4E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	4.6E-09	mg/L	9.1E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Bismuth-214	1.0E+01	pCi/L	--	--	9.8E+07	pCi/L	1.E-13
				Lead-210	3.2E+01	pCi/L	--	--	8.4E+10	pCi/L	4.E-16
				Lead-212	3.3E+00	pCi/L	--	--	9.7E+07	pCi/L	3.E-14
				Lead-214	7.9E+00	pCi/L	--	--	8.5E+07	pCi/L	9.E-14
				Potassium-40	4.0E+01	pCi/L	--	--	9.1E+08	pCi/L	4.E-14
				Radium-226	1.0E+02	pCi/L	--	--	8.5E+07	pCi/L	1.E-12
				Radium-228	5.7E+00	pCi/L	--	--	6.2E+07	pCi/L	9.E-14
				Strontium-90	1.5E+00	pCi/L	--	--	3.6E+10	pCi/L	4.E-17
			Exp. Route Total								2.E-07
		Exposure Medium Total									2.E-07
Groundwater Total											2.E-07

Table 8.10

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air (Vapor Intrusion from Site Groundwater)
Exposure Point: Indoor Air
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Air	Indoor Air (Vapor Intrusion)	Inhalation	Cyanide	6.4E-05	mg/m^3	5.2E-06	mg/kg-day	NV	mg/kg-day	NV
				Mercury	6.0E-05	mg/m^3	4.9E-06	mg/kg-day	NV	mg/kg-day	NV
				Vinyl chloride	5.8E-03	mg/m^3	4.7E-04	mg/kg-day	4.4E-03	mg/kg-day	2.E-06
			Exp. Route Total								2.E-06
	Exposure Medium Total										2.E-06
Groundwater Total											2.E-06

Table 8.11

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air
Exposure Point: Air Inside an Open Excavation
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		CSF/Unit Risk		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Air	Air Inside an Open Excavation	Inhalation	Cyanide	1.5E-01	mg/m^3	5.9E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
			Exp. Route Total								0.E+00
	Exposure Medium Total										0.E+00
Groundwater Total											0.E+00

Table 8.12
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User/Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	5.7E-06	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Dieldrin	2.3E-03	mg/kg	1.7E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	4,4'-DDD	1.3E-02	mg/kg	9.6E-07	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	4,4'-DDE	2.1E-02	mg/kg	1.5E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	5.E-07
	4,4'-DDT	1.4E-01	mg/kg	1.0E-05	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aroclor 1254	8.0E-02	mg/kg	5.9E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-05
	High Risk PCB Congeners	8.8E-01	mg/kg	6.5E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-04
	Aluminum	2.6E+02	mg/kg	1.9E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.7E+00	mg/kg	1.3E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Chromium (Hexavalent)	2.3E-02	mg/kg	See Table 8.12a for mutagenic calculations				5.E-06
	Cobalt	2.5E-01	mg/kg	1.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	5.6E+00	mg/kg	4.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	3.0E+02	mg/kg	2.2E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	1.1E+01	mg/kg	7.8E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	1.0E+00	mg/kg	7.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.9E+02	mg/kg	1.4E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.8E-06	mg/kg	2.1E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-05
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	5.8E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-04
	Bismuth-214	1.8E-01	pCi/g	--	--	1.03E-02	pCi/g	2.E-05
	Cesium-137	4.8E-02	pCi/g	--	--	9.49E-01	pCi/g	5.E-08
	Lead-214	2.0E-01	pCi/g	--	--	1.03E-02	pCi/g	2.E-05
	Potassium-40	3.7E+00	pCi/g	--	--	1.04E+00	pCi/g	4.E-06
	Radium-228	2.6E-01	pCi/g	--	--	1.92E-02	pCi/g	1.E-05
	Strontium-90	1.2E-01	pCi/g	--	--	3.72E-01	pCi/g	3.E-07
	Uranium-235	3.4E-02	pCi/g	--	--	3.63E-02	pCi/g	9.E-07
Fish Tissue Ingestion Route Total								1.E-03
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	See Table 8.12a for mutagenic calculations				6.E-06
	Aldrin	1.9E-03	mg/kg	1.1E-07	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Dieldrin	3.3E-03	mg/kg	1.9E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	4,4'-DDD	1.2E-02	mg/kg	6.8E-07	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	4,4'-DDE	3.2E-02	mg/kg	1.8E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Heptachlor epoxide	3.2E-03	mg/kg	1.8E-07	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Aroclor 1254	6.3E-02	mg/kg	3.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.E-06
	High Risk PCB Congeners	1.5E-01	mg/kg	8.7E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Arsenic	7.9E-01	mg/kg	4.5E-05	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.E-05
	Cadmium	4.0E-01	mg/kg	2.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	5.2E-01	mg/kg	See Table 8.12a for mutagenic calculations				8.E-05
	Cobalt	2.8E-01	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.8E+01	mg/kg	2.7E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.5E+02	mg/kg	8.5E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.2E+03	mg/kg	6.9E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	1.3E-01	mg/kg	7.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	5.7E-06	mg/kg	3.2E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-05
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	9.4E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Bismuth-214	1.5E-01	pCi/g	--	--	1.34E-02	pCi/g	1.E-05
	Cesium-137	4.2E-02	pCi/g	--	--	1.24E+00	pCi/g	3.E-08
	Lead-214	5.5E-02	pCi/g	--	--	1.34E-02	pCi/g	4.E-06
	Potassium-40	3.2E+00	pCi/g	--	--	1.35E+00	pCi/g	2.E-06
	Radium-228	2.3E-01	pCi/g	--	--	2.50E-02	pCi/g	9.E-06
	Strontium-90	1.1E-01	pCi/g	--	--	4.85E-01	pCi/g	2.E-07
	Uranium-235	3.0E-02	pCi/g	--	--	4.73E-02	pCi/g	6.E-07
Shellfish Tissue Ingestion Route Total								3.E-04
							Total of Receptor Risks Across All Media	1.E-03

Table 8.12a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion of Fish Tissue									
	Ingestion									0.E+00
	Age 0 -2 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	0.E+00	
	Age 2 - 6 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Ingestion of Shellfish Tissue									
	Ingestion									6.E-06
	Age 0 -2 years	2.1E-01	mg/kg	4.0E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-06	
	Age 2 - 6 years	2.1E-01	mg/kg	7.9E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-06	
Chromium	Ingestion of Fish Tissue									
	Ingestion									5.E-06
	Age 0 -2 years	2.3E-02	mg/kg	5.7E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	3.E-06	
	Age 2 - 6 years	2.3E-02	mg/kg	1.1E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-06	
	Ingestion of Shellfish Tissue									
	Ingestion									8.E-05
	Age 0 -2 years	5.2E-01	mg/kg	9.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	5.E-05	
	Age 2 - 6 years	5.2E-01	mg/kg	2.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.E-05	

Table 8.13
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor (chemical COPCs) Screening value (radionuclides) Value	Cancer Slope Factor (chemical COPCs) Screening value (radionuclides) Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	5.1E-06	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Dieldrin	2.3E-03	mg/kg	1.5E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	4,4'-DDD	1.3E-02	mg/kg	8.4E-07	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	4,4'-DDE	2.1E-02	mg/kg	1.4E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	5.E-07
	4,4'-DDT	1.4E-01	mg/kg	9.0E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aroclor 1254	8.0E-02	mg/kg	5.2E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-05
	High Risk PCB Congeners	8.8E-01	mg/kg	5.7E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-04
	Aluminum	2.6E+02	mg/kg	1.7E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.7E+00	mg/kg	1.1E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Chromium (Hexavalent)	2.3E-02	mg/kg	See Table 8.13a for mutagenic calculations				2.E-06
	Cobalt	2.5E-01	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	5.6E+00	mg/kg	3.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	3.0E+02	mg/kg	1.9E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	1.1E+01	mg/kg	6.8E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	1.0E+00	mg/kg	6.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.9E+02	mg/kg	1.2E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.8E-06	mg/kg	1.8E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-05
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	5.1E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-04
	Bismuth-214	1.8E-01	pCi/g	--	--	3.24E-03	pCi/g	5.E-05
	Cesium-137	4.8E-02	pCi/g	--	--	2.98E-01	pCi/g	2.E-07
	Lead-214	2.0E-01	pCi/g	--	--	3.23E-03	pCi/g	6.E-05
	Potassium-40	3.7E+00	pCi/g	--	--	3.26E-01	pCi/g	1.E-05
	Radium-228	2.6E-01	pCi/g	--	--	6.02E-03	pCi/g	4.E-05
	Strontium-90	1.2E-01	pCi/g	--	--	1.17E-01	pCi/g	1.E-06
	Uranium-235	3.4E-02	pCi/g	--	--	1.14E-02	pCi/g	3.E-06
Fish Tissue Ingestion Route Total								1.E-03
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	See Table 8.13a for mutagenic calculations				4.E-06
	Aldrin	1.9E-03	mg/kg	1.1E-07	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Dieldrin	3.3E-03	mg/kg	2.0E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	4,4'-DDD	1.2E-02	mg/kg	7.2E-07	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	4,4'-DDE	3.2E-02	mg/kg	1.9E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Heptachlor epoxide	3.2E-03	mg/kg	1.9E-07	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Aroclor 1254	6.3E-02	mg/kg	3.8E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-06
	High Risk PCB Congeners	1.5E-01	mg/kg	9.2E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Arsenic	7.9E-01	mg/kg	4.7E-05	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.E-05
	Cadmium	4.0E-01	mg/kg	2.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	5.2E-01	mg/kg	See Table 8.13a for mutagenic calculations				5.E-05
	Cobalt	2.8E-01	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.8E+01	mg/kg	2.9E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.5E+02	mg/kg	9.0E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.2E+03	mg/kg	7.3E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	1.3E-01	mg/kg	7.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	5.7E-06	mg/kg	3.4E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-05
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	1.0E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Bismuth-214	1.5E-01	pCi/g	--	--	3.51E-03	pCi/g	4.E-05
	Cesium-137	4.2E-02	pCi/g	--	--	3.24E-01	pCi/g	1.E-07
	Lead-214	5.5E-02	pCi/g	--	--	3.51E-03	pCi/g	2.E-05
	Potassium-40	3.2E+00	pCi/g	--	--	3.54E-01	pCi/g	9.E-06
	Radium-228	2.3E-01	pCi/g	--	--	6.54E-03	pCi/g	4.E-05
	Strontium-90	1.1E-01	pCi/g	--	--	1.27E-01	pCi/g	8.E-07
	Uranium-235	3.0E-02	pCi/g	--	--	1.24E-02	pCi/g	2.E-06
Shellfish Tissue Ingestion Route Total								3.E-04
							Total of Receptor Hazards Across All Media	1.E-03

Table 8.13a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion of Fish Tissue									
	Ingestion									0.E+00
	Age 9 - 16 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Age 16 - 18 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Ingestion of Shellfish Tissue									
	Ingestion									4.E-06
	Age 9 - 16 years	2.1E-01	mg/kg	9.7E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-06	
	Age 16 - 18 years	2.1E-01	mg/kg	2.8E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	8.E-07	
Chromium	Ingestion of Fish Tissue									
	Ingestion									2.E-06
	Age 9 - 16 years	2.3E-02	mg/kg	1.2E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 18 years	2.3E-02	mg/kg	3.4E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.E-07	
	Ingestion of Shellfish Tissue									
	Ingestion									5.E-05
	Age 9 - 16 years	5.2E-01	mg/kg	2.4E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-05	
	Age 16 - 18 years	5.2E-01	mg/kg	6.9E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-05	

Table 8.14
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Current/Future Recreational User/Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	1.1E-05	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	4.E-06
	Dieldrin	2.3E-03	mg/kg	3.3E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	5.E-06
	4,4'-DDD	1.3E-02	mg/kg	1.9E-06	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	4.E-07
	4,4'-DDE	2.1E-02	mg/kg	3.0E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	1.E-06
	4,4'-DDT	1.4E-01	mg/kg	2.0E-05	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	7.E-06
	Aroclor 1254	8.0E-02	mg/kg	1.2E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	High Risk PCB Congeners	8.8E-01	mg/kg	1.3E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-04
	Aluminum	2.6E+02	mg/kg	3.8E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.7E+00	mg/kg	2.5E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-04
	Chromium (Hexavalent)	2.3E-02	mg/kg	3.4E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Cobalt	2.5E-01	mg/kg	3.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	5.6E+00	mg/kg	8.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	3.0E+02	mg/kg	4.3E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	1.1E+01	mg/kg	1.5E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	1.0E+00	mg/kg	1.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.9E+02	mg/kg	2.7E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.8E-06	mg/kg	4.1E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-05
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	1.1E-08	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-03
	Bismuth-214	1.8E-01	pCi/g	--	--	9.88E-04	pCi/g	2.E-04
	Cesium-137	4.8E-02	pCi/g	--	--	9.10E-02	pCi/g	5.E-07
	Lead-214	2.0E-01	pCi/g	--	--	9.88E-04	pCi/g	2.E-04
	Potassium-40	3.7E+00	pCi/g	--	--	9.95E-02	pCi/g	4.E-05
	Radium-228	2.6E-01	pCi/g	--	--	1.84E-03	pCi/g	1.E-04
	Strontium-90	1.2E-01	pCi/g	--	--	3.57E-02	pCi/g	3.E-06
	Uranium-235	3.4E-02	pCi/g	--	--	3.48E-03	pCi/g	1.E-05
Fish Tissue Ingestion Route Total								3.E-03
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	3.2E-05	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aldrin	1.9E-03	mg/kg	2.9E-07	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	5.E-06
	Dieldrin	3.3E-03	mg/kg	5.0E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	8.E-06
	4,4'-DDD	1.2E-02	mg/kg	1.8E-06	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	4.E-07
	4,4'-DDE	3.2E-02	mg/kg	4.7E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Heptachlor epoxide	3.2E-03	mg/kg	4.7E-07	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	4.E-06
	Aroclor 1254	6.3E-02	mg/kg	9.5E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	High Risk PCB Congeners	1.5E-01	mg/kg	2.3E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-05
	Arsenic	7.9E-01	mg/kg	1.2E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Cadmium	4.0E-01	mg/kg	6.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	5.2E-01	mg/kg	7.8E-05	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	4.E-05
	Cobalt	2.8E-01	mg/kg	4.1E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.8E+01	mg/kg	7.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.5E+02	mg/kg	2.3E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.2E+03	mg/kg	1.8E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	1.3E-01	mg/kg	2.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	5.7E-06	mg/kg	8.5E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-04
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	2.5E-10	mg/kg-day	1.3E+05	pCi/g	3.E-05
	Bismuth-214	1.5E-01	pCi/g	--	--	9.43E-04	pCi/g	2.E-04
	Cesium-137	4.2E-02	pCi/g	--	--	8.69E-02	pCi/g	5.E-07
	Lead-214	5.5E-02	pCi/g	--	--	9.43E-04	pCi/g	6.E-05
	Potassium-40	3.2E+00	pCi/g	--	--	9.50E-02	pCi/g	3.E-05
	Radium-228	2.3E-01	pCi/g	--	--	1.75E-03	pCi/g	1.E-04
	Strontium-90	1.1E-01	pCi/g	--	--	3.41E-02	pCi/g	3.E-06
	Uranium-235	3.0E-02	pCi/g	--	--	3.32E-03	pCi/g	9.E-06
Shellfish Tissue Ingestion Route Total								8.E-04
							Total of Receptor Hazards Across All Media	4.E-03

Table 8.15
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Future Subsistence Fisherman
Receptor Age: Age-Adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	6.7E-05	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Dieldrin	2.3E-03	mg/kg	2.0E-06	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.E-05
	4,4'-DDD	1.3E-02	mg/kg	1.1E-05	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	3.E-06
	4,4'-DDE	2.1E-02	mg/kg	1.8E-05	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	6.E-06
	4,4'-DDT	1.4E-01	mg/kg	1.2E-04	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	4.E-05
	Aroclor 1254	8.0E-02	mg/kg	6.9E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-04
	High Risk PCB Congeners	8.8E-01	mg/kg	7.6E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-03
	Aluminum	2.6E+02	mg/kg	2.3E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.7E+00	mg/kg	1.5E-03	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-03
	Chromium (Hexavalent)	2.3E-02	mg/kg	See Table 8.15a for mutagenic calculations				3.E-05
	Cobalt	2.5E-01	mg/kg	2.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	5.6E+00	mg/kg	4.8E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	3.0E+02	mg/kg	2.6E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	1.1E+01	mg/kg	9.1E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	1.0E+00	mg/kg	8.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.9E+02	mg/kg	1.6E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.8E-06	mg/kg	2.4E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-04
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	6.8E-08	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-03
	Bismuth-214	1.8E-01	pCi/g	--	--	1.98E-04	pCi/g	9.E-04
	Cesium-137	4.8E-02	pCi/g	--	--	1.83E-02	pCi/g	3.E-06
	Lead-214	2.0E-01	pCi/g	--	--	1.98E-04	pCi/g	1.E-03
	Potassium-40	3.7E+00	pCi/g	--	--	2.00E-02	pCi/g	2.E-04
	Radium-228	2.6E-01	pCi/g	--	--	3.69E-04	pCi/g	7.E-04
	Strontium-90	1.2E-01	pCi/g	-	--	7.16E-03	pCi/g	2.E-05
	Uranium-235	3.4E-02	pCi/g	--	--	6.98E-04	pCi/g	5.E-05
Fish Tissue Ingestion Route Total								2.E-02
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	See Table 8.15a for mutagenic calculations				8.E-05
	Aldrin	1.9E-03	mg/kg	2.8E-06	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	5.E-05
	Dieldrin	3.3E-03	mg/kg	4.8E-06	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	8.E-05
	4,4'-DDD	1.2E-02	mg/kg	1.8E-05	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	4.E-06
	4,4'-DDE	3.2E-02	mg/kg	4.6E-05	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Heptachlor epoxide	3.2E-03	mg/kg	4.6E-06	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	4.E-05
	Aroclor 1254	6.3E-02	mg/kg	9.2E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	High Risk PCB Congeners	1.5E-01	mg/kg	2.3E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-04
	Arsenic	7.9E-01	mg/kg	1.2E-03	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-03
	Cadmium	4.0E-01	mg/kg	5.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	5.2E-01	mg/kg	See Table 8.15a for mutagenic calculations				9.E-04
	Cobalt	2.8E-01	mg/kg	4.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.8E+01	mg/kg	7.1E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.5E+02	mg/kg	2.2E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.2E+03	mg/kg	1.8E+00	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	1.3E-01	mg/kg	1.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	5.7E-06	mg/kg	8.3E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-03
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	2.4E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-04
	Bismuth-214	1.5E-01	pCi/g	--	--	1.09E-04	pCi/g	1.E-03
	Cesium-137	4.2E-02	pCi/g	--	--	1.01E-02	pCi/g	4.E-06
	Lead-214	5.5E-02	pCi/g	--	--	1.09E-04	pCi/g	5.E-04
	Potassium-40	3.2E+00	pCi/g	--	--	1.10E-02	pCi/g	3.E-04
	Radium-228	2.3E-01	pCi/g	--	--	2.03E-04	pCi/g	1.E-03
	Strontium-90	1.1E-01	pCi/g	--	--	3.95E-03	pCi/g	3.E-05
	Uranium-235	3.0E-02	pCi/g	--	--	3.85E-04	pCi/g	8.E-05
Shellfish Tissue Ingestion Route Total								8.E-03
							Total of Receptor Hazards Across All Media	2.E-02

Table 8.15a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion of Fish Tissue									
	Ingestion									0.E+00
	Age 0 -2 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	0.E+00	
	Age 2 - 6 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Age 6 - 16 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Age 16 - 26 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	0.E+00	
	Ingestion of Shellfish Tissue									
	Ingestion									8.E-05
	Age 0 -2 years	2.1E-01	mg/kg	1.4E-05	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-05	
	Age 2 - 6 years	2.1E-01	mg/kg	2.9E-05	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	9.E-06	
	Age 6 - 16 years	2.1E-01	mg/kg	1.3E-04	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-05	
	Age 16 - 26 years	2.1E-01	mg/kg	1.3E-04	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-05	
Chromium	Ingestion of Fish Tissue									
	Ingestion									3.E-05
	Age 0 -2 years	2.3E-02	mg/kg	1.3E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.E-06	
	Age 2 - 6 years	2.3E-02	mg/kg	2.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-06	
	Age 6 - 16 years	2.3E-02	mg/kg	8.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-05	
	Age 16 - 26 years	2.3E-02	mg/kg	8.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	4.E-06	
	Ingestion of Shellfish Tissue									
	Ingestion									9.E-04
	Age 0 -2 years	5.2E-01	mg/kg	3.6E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.E-04	
	Age 2 - 6 years	5.2E-01	mg/kg	7.1E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-04	
	Age 6 - 16 years	5.2E-01	mg/kg	3.3E-04	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.E-04	
	Age 16 - 26 years	5.2E-01	mg/kg	3.3E-04	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.E-04	

Table 8.16
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Fish/Shellfish
Exposure Medium: Fish/Shellfish
Exposure Point: Paradise Creek
Receptor Population: Resident
Receptor Age: Child/Adult, Age-Adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion of Fish Tissue								
	Chlordane	7.8E-02	mg/kg	1.7E-05	mg/kg-day	3.5E-01	$(mg/kg\text{-}day)^{-1}$	6.E-06
	Dieldrin	2.3E-03	mg/kg	5.0E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	8.E-06
	4,4'-DDD	1.3E-02	mg/kg	2.8E-06	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	7.E-07
	4,4'-DDE	2.1E-02	mg/kg	4.6E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	4,4'-DDT	1.4E-01	mg/kg	3.0E-05	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Aroclor 1254	8.0E-02	mg/kg	1.7E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-05
	High Risk PCB Congeners	8.8E-01	mg/kg	1.9E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-04
	Aluminum	2.6E+02	mg/kg	5.7E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.7E+00	mg/kg	3.7E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-04
	Chromium (Hexavalent)	2.3E-02	mg/kg	See Table 8.16a for mutagenic calculations				8.E-06
	Cobalt	2.5E-01	mg/kg	5.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	5.6E+00	mg/kg	1.2E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	3.0E+02	mg/kg	6.5E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	1.1E+01	mg/kg	2.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	1.0E+00	mg/kg	2.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.9E+02	mg/kg	4.1E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.8E-06	mg/kg	6.1E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-05
	2,3,7,8-TCDD TEQ	7.9E-05	mg/kg	1.7E-08	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-03
	Bismuth-214	1.8E-01	pCi/g	--	--	8.99E-04	pCi/g	2.E-04
	Cesium-137	4.8E-02	pCi/g	--	--	8.28E-02	pCi/g	6.E-07
	Lead-214	2.0E-01	pCi/g	--	--	8.99E-04	pCi/g	2.E-04
	Potassium-40	3.7E+00	pCi/g	--	--	9.05E-02	pCi/g	4.E-05
	Radium-228	2.6E-01	pCi/g	--	--	1.67E-03	pCi/g	2.E-04
	Strontium-90	1.2E-01	pCi/g	--	--	3.25E-02	pCi/g	4.E-06
	Uranium-235	3.4E-02	pCi/g	--	--	3.17E-03	pCi/g	1.E-05
Fish Tissue Ingestion Route Total								4.E-03
Ingestion of Shellfish Tissue								
	Benzo(b)fluoranthene	2.1E-01	mg/kg	See Table 8.16a for mutagenic calculations				1.E-05
	Aldrin	1.9E-03	mg/kg	3.9E-07	mg/kg-day	1.7E+01	$(mg/kg\text{-}day)^{-1}$	7.E-06
	Dieldrin	3.3E-03	mg/kg	6.8E-07	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.E-05
	4,4'-DDD	1.2E-02	mg/kg	2.5E-06	mg/kg-day	2.4E-01	$(mg/kg\text{-}day)^{-1}$	6.E-07
	4,4'-DDE	3.2E-02	mg/kg	6.5E-06	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Heptachlor epoxide	3.2E-03	mg/kg	6.5E-07	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	6.E-06
	Aroclor 1254	6.3E-02	mg/kg	1.3E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-05
	High Risk PCB Congeners	1.5E-01	mg/kg	3.2E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-05
	Arsenic	7.9E-01	mg/kg	1.6E-04	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Cadmium	4.0E-01	mg/kg	8.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	5.2E-01	mg/kg	See Table 8.16a for mutagenic calculations				2.E-04
	Cobalt	2.8E-01	mg/kg	5.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.8E+01	mg/kg	1.0E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.5E+02	mg/kg	3.1E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	1.2E+03	mg/kg	2.5E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	1.3E-01	mg/kg	2.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	5.7E-06	mg/kg	1.2E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-04
	2,3,7,8-TCDD TEQ	1.7E-06	mg/kg	3.5E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-05
	Bismuth-214	1.5E-01	pCi/g	--	--	8.80E-04	pCi/g	2.E-04
	Cesium-137	4.2E-02	pCi/g	--	--	8.11E-02	pCi/g	5.E-07
	Lead-214	5.5E-02	pCi/g	--	--	8.80E-04	pCi/g	6.E-05
	Potassium-40	3.2E+00	pCi/g	--	--	8.87E-02	pCi/g	4.E-05
	Radium-228	2.3E-01	pCi/g	--	--	1.64E-03	pCi/g	1.E-04
	Strontium-90	1.1E-01	pCi/g	--	--	3.18E-02	pCi/g	3.E-06
	Uranium-235	3.0E-02	pCi/g	--	--	3.10E-03	pCi/g	1.E-05
Shellfish Tissue Ingestion Route Total								1.E-03
							Total of Receptor Hazards Across All Media	5.E-03

Table 8.16a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion of Fish Tissue									
	Ingestion									0.E+00
	Age 0 -2 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	0.E+00	
	Age 2 - 6 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Age 6 - 16 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	0.E+00	
	Age 16 - 26 years	0.0E+00	mg/kg	0.0E+00	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	0.E+00	
	Ingestion of Shellfish Tissue									
	Ingestion									1.E-05
	Age 0 -2 years	2.1E-01	mg/kg	4.0E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-06	
	Age 2 - 6 years	2.1E-01	mg/kg	7.9E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-06	
	Age 6 - 16 years	2.1E-01	mg/kg	1.6E-05	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-06	
	Age 16 - 26 years	2.1E-01	mg/kg	1.6E-05	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-06	
Chromium	Ingestion of Fish Tissue									
	Ingestion									8.E-06
	Age 0 -2 years	2.3E-02	mg/kg	5.7E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	3.E-06	
	Age 2 - 6 years	2.3E-02	mg/kg	1.1E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-06	
	Age 6 - 16 years	2.3E-02	mg/kg	1.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.E-06	
	Age 16 - 26 years	2.3E-02	mg/kg	1.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	8.E-07	
	Ingestion of Shellfish Tissue									
	Ingestion									2.E-04
	Age 0 -2 years	5.2E-01	mg/kg	9.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	5.E-05	
	Age 2 - 6 years	5.2E-01	mg/kg	2.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.E-05	
	Age 6 - 16 years	5.2E-01	mg/kg	3.9E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.E-05	
	Age 16 - 26 years	5.2E-01	mg/kg	3.9E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.E-05	

Table 8.17
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.17a for mutagenic calculations				9.E-07
	Arsenic	3.0E+01	mg/kg	8.5E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.17a for mutagenic calculations				7.E-06
	Cobalt	5.3E+01	mg/kg	2.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	2.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	pCi/g	1.3E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Radium-226	6.1E-01	pCi/g	--	--	9.76E+00	pCi/g	6.E-08
	Radium-228	5.7E-01	pCi/g	--	--	2.04E+01	pCi/g	3.E-08
Ingestion Route Total								1.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.17a for mutagenic calculations				4.E-07
	Arsenic	3.0E+01	mg/kg	1.5E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.17a for mutagenic calculations				1.E-05
	Cobalt	5.3E+01	mg/kg	8.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	9.2E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.4E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Radium-226	6.1E-01	pCi/g	--	--	3.88E+00	pCi/g	2.E-07
	Radium-228	5.7E-01	pCi/g	--	--	2.79E+00	pCi/g	2.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	2.E-05

Notes:
For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.17a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									9.E-07
	Age 0 - 2 years	3.4E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.3E-07	
	Age 2 - 6 years	3.4E+00	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.2E-07	
	Dermal Absorption									4.E-07
	Age 0 - 2 years	3.4E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.5E-07	
	Age 2 - 6 years	3.4E+00	mg/kg	4.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.5E-07	
Chromium	Ingestion									7.E-06
	Age 0 - 2 years	5.4E+01	mg/kg	8.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	4.3E-06	
	Age 2 - 6 years	5.4E+01	mg/kg	1.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.6E-06	
	Dermal Absorption									1.E-05
	Age 0 - 2 years	5.4E+01	mg/kg	3.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	6.1E-06	
	Age 2 - 6 years	5.4E+01	mg/kg	6.1E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.6E-06	

Table 8.18
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.18a for mutagenic calculations				8.E-08
	Arsenic	3.0E+01	mg/kg	1.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.18a for mutagenic calculations				7.E-07
	Cobalt	5.3E+01	mg/kg	5.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	5.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	pCi/g	2.8E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Radium-226	6.1E-01	pCi/g	--	--	1.30E+01	pCi/g	5.E-08
	Radium-228	5.7E-01	pCi/g	--	--	2.73E+01	pCi/g	2.E-08
Ingestion Route Total								1.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.18a for mutagenic calculations				3.E-07
	Arsenic	3.0E+01	mg/kg	2.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.18a for mutagenic calculations				8.E-06
	Cobalt	5.3E+01	mg/kg	1.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Radium-226	6.1E-01	pCi/g	--	--	2.59E+00	pCi/g	2.E-07
	Radium-228	5.7E-01	pCi/g	--	--	1.86E+00	pCi/g	3.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	1.E-05

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.18a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									8.E-08
	Age 9 - 16 years	3.4E+00	mg/kg	2.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.7E-08	
	Age 16 - 18 years	3.4E+00	mg/kg	7.3E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	7.3E-09	
	Dermal Absorption									3.E-07
	Age 9 - 16 years	3.4E+00	mg/kg	1.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.1E-07	
	Age 16 - 18 years	3.4E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.9E-08	
Chromium	Ingestion									7.E-07
	Age 9 - 16 years	5.4E+01	mg/kg	4.1E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.1E-07	
	Age 16 - 18 years	5.4E+01	mg/kg	1.2E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	5.8E-08	
	Dermal Absorption									8.E-06
	Age 9 - 16 years	5.4E+01	mg/kg	1.3E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	7.5E-06	
	Age 16 - 18 years	5.4E+01	mg/kg	3.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	7.2E-07	

Table 8.19
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	5.0E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Arsenic	3.0E+01	mg/kg	2.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	8.0E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	4.0E-07
	Cobalt	5.3E+01	mg/kg	7.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	8.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	4.2E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	Radium-226	6.1E-01	pCi/g	--	--	5.85E+00	pCi/g	1.E-07
	Radium-228	5.7E-01	pCi/g	--	--	1.23E+01	pCi/g	5.E-08
Ingestion Route Total								2.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Arsenic	3.0E+01	mg/kg	2.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	1.4E-07	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.9E-06
	Cobalt	5.3E+01	mg/kg	1.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.3E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Radium-226	6.1E-01	pCi/g	--	--	1.17E+00	pCi/g	5.E-07
	Radium-228	5.7E-01	pCi/g	--	--	8.36E-01	pCi/g	7.E-07
Dermal Absorption Route Total								5.E-06
							Total of Receptor Risks Across All Media	6.E-06

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.20
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Northern Drainage Channel Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	2.7E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Arsenic	3.0E+01	mg/kg	1.5E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Chromium (Hexavalent)	5.4E+01	mg/kg	4.4E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Cobalt	5.3E+01	mg/kg	4.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	4.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.3E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Radium-226	6.1E-01	pCi/g	--	--	2.60E+02	pCi/g	2.E-09
	Radium-228	5.7E-01	pCi/g	--	--	7.28E+02	pCi/g	8.E-10
Ingestion Route Total								8.E-08
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	1.1E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Arsenic	3.0E+01	mg/kg	2.3E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Chromium (Hexavalent)	5.4E+01	mg/kg	1.4E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Cobalt	5.3E+01	mg/kg	1.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	1.4E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.2E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Radium-226	6.1E-01	pCi/g	--	--	3.50E+01	pCi/g	2.E-08
	Radium-228	5.7E-01	pCi/g	--	--	2.51E+01	pCi/g	2.E-08
Dermal Absorption Route Total								8.E-08
Inhalation								
	Chromium (Hexavalent)	4.9E-07	mg/m^3	3.2E-11	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	3.E-09
	Mercury	6.6E-04	mg/m^3	4.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.8E-10	mg/m^3	2.5E-14	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.E-09
Inhalation Route Total								4.E-09
							Total of Receptor Risks Across All Media	2.E-07

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Vapor pressures for VOCs obtained from ATSDR and NIOSH. If chemical not in those sources, used 0.03

Inhalation risk = Adjusted CA x Inhalation Unit Risk

Table 8.21
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment
Exposure Point: Northern Drainage Channel Sediment
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.21a for Mutagenic Risks				1.E-06
	Arsenic	3.0E+01	mg/kg	1.1E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.21a for Mutagenic Risks				8.E-06
	Cobalt	5.3E+01	mg/kg	3.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	3.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.8E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Radium-226	6.1E-01	pCi/g	--	--	3.66E+00	pCi/g	2.E-07
	Radium-228	5.7E-01	pCi/g	--	--	7.67E+00	pCi/g	7.E-08
Ingestion Route Total								1.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	3.4E+00	mg/kg	See Table 8.21a for Mutagenic Risks				6.E-07
	Arsenic	3.0E+01	mg/kg	3.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Chromium (Hexavalent)	5.4E+01	mg/kg	See Table 8.21a for Mutagenic Risks				2.E-05
	Cobalt	5.3E+01	mg/kg	2.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	5.5E+00	mg/kg	2.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	3.7E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Radium-226	6.1E-01	pCi/g	--	--	8.96E-01	pCi/g	7.E-07
	Radium-228	5.7E-01	pCi/g	--	--	6.43E-01	pCi/g	9.E-07
Dermal Absorption Route Total								2.E-05
							Total of Receptor Risks Across All Media	3.E-05

Notes:
For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.21a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									1.E-06
	Age 0 -2 years	3.4E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.3E-07	
	Age 2 - 6 years	3.4E+00	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.2E-07	
	Age 6 - 16 years	3.4E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.5E-08	
	Age 16 - 26 years	3.4E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.5E-08	
	Dermal Absorption									6.E-07
	Age 0 -2 years	3.4E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.5E-07	
	Age 2 - 6 years	3.4E+00	mg/kg	4.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.5E-07	
	Age 6 - 16 years	3.4E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.8E-07	
	Age 16 - 26 years	3.4E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.9E-08	
Chromium	Ingestion									8.E-06
	Age 0 -2 years	5.4E+01	mg/kg	8.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	4.3E-06	
	Age 2 - 6 years	5.4E+01	mg/kg	1.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.6E-06	
	Age 6 - 16 years	5.4E+01	mg/kg	4.0E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.0E-07	
	Age 16 - 26 years	5.4E+01	mg/kg	4.0E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.0E-07	
	Dermal Absorption									2.E-05
	Age 0 -2 years	5.4E+01	mg/kg	3.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	6.1E-06	
	Age 2 - 6 years	5.4E+01	mg/kg	6.1E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.6E-06	
	Age 6 - 16 years	5.4E+01	mg/kg	7.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.3E-06	
	Age 16 - 26 years	5.4E+01	mg/kg	7.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.4E-06	

Table 8.22
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	5.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.22a for mutagenic calculations				3.E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	3.31E+04	pCi/g	3.E-11
	Bismuth-214	9.3E-01	pCi/g	--	--	1.11E+01	pCi/g	8.E-08
	Lead-212	7.3E-01	pCi/g	--	--	8.55E+02	pCi/g	9.E-10
	Lead-214	1.0E+00	pCi/g	--	--	1.11E+01	pCi/g	9.E-08
	Potassium-40	7.9E+00	pCi/g	--	--	9.50E+02	pCi/g	8.E-09
	Radium-226	1.8E+00	pCi/g	--	--	9.76E+00	pCi/g	2.E-07
	Radium-228	7.4E-01	pCi/g	--	--	2.04E+01	pCi/g	4.E-08
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	9.15E+00	pCi/g	8.E-08
Ingestion Route Total								4.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	9.1E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.22a for mutagenic calculations				4.E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	4.02E+00	pCi/g	2.E-07
	Bismuth-214	9.3E-01	pCi/g	--	--	3.86E+00	pCi/g	2.E-07
	Lead-212	7.3E-01	pCi/g	--	--	3.81E+00	pCi/g	2.E-07
	Lead-214	1.0E+00	pCi/g	--	--	3.45E+00	pCi/g	3.E-07
	Potassium-40	7.9E+00	pCi/g	--	--	3.47E+01	pCi/g	2.E-07
	Radium-226	1.8E+00	pCi/g	--	--	3.44E+00	pCi/g	5.E-07
	Radium-228	7.4E-01	pCi/g	--	--	2.49E+00	pCi/g	3.E-07
	Thallium-208	2.3E-01	pCi/g	--	--	1.55E+00	pCi/g	1.E-07
	Thorium-234	7.8E-01	pCi/g	--	--	3.40E+00	pCi/g	2.E-07
Dermal Absorption Route Total								6.E-06
							Total of Receptor Risks Across All Media	1.E-05

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.22a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									3.E-06
	Age 9 - 16 years	2.0E+01	mg/kg	3.2E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.6E-06	
	Age 16 - 18 years	2.0E+01	mg/kg	6.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	9.5E-07	
	Dermal Absorption									4.E-06
	Age 6 - 16 years	2.0E+01	mg/kg	1.1E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	2.2E-06	
	Age 16 - 30 years	2.0E+01	mg/kg	2.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	1.3E-06	

Table 8.23
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.23a for mutagenic calculations				2.E-07
	Bismuth-212	8.5E-01	pCi/g	--	mg/kg-day	4.41E+04	pCi/g	2.E-11
	Bismuth-214	9.3E-01	pCi/g	--	mg/kg-day	1.48E+01	pCi/g	6.E-08
	Lead-212	7.3E-01	pCi/g	--	mg/kg-day	1.14E+03	pCi/g	6.E-10
	Lead-214	1.0E+00	pCi/g	--	mg/kg-day	1.48E+01	pCi/g	7.E-08
	Potassium-40	7.9E+00	pCi/g	--	mg/kg-day	1.27E+03	pCi/g	6.E-09
	Radium-226	1.8E+00	pCi/g	--	mg/kg-day	1.30E+01	pCi/g	1.E-07
	Radium-228	7.4E-01	pCi/g	--	mg/kg-day	2.73E+01	pCi/g	3.E-08
	Thallium-208	2.3E-01	pCi/g	--	mg/kg-day	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	mg/kg-day	1.22E+01	pCi/g	6.E-08
Ingestion Route Total								8.E-07
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.23a for mutagenic calculations				3.E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	2.68E+00	pCi/g	3.E-07
	Bismuth-214	9.3E-01	pCi/g	--	--	2.57E+00	pCi/g	4.E-07
	Lead-212	7.3E-01	pCi/g	--	--	2.54E+00	pCi/g	3.E-07
	Lead-214	1.0E+00	pCi/g	--	--	2.30E+00	pCi/g	5.E-07
	Potassium-40	7.9E+00	pCi/g	--	--	2.31E+01	pCi/g	3.E-07
	Radium-226	1.8E+00	pCi/g	--	--	2.30E+00	pCi/g	8.E-07
	Radium-228	7.4E-01	pCi/g	--	--	1.66E+00	pCi/g	4.E-07
	Thallium-208	2.3E-01	pCi/g	--	--	1.03E+00	pCi/g	2.E-07
	Thorium-234	7.8E-01	pCi/g	--	--	2.26E+00	pCi/g	3.E-07
Dermal Absorption Route Total								7.E-06
							Total of Receptor Risks Across All Media	8.E-06

Notes:
For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.
Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.23a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									2.E-07
	Age 9 - 16 years	2.0E+01	mg/kg	1.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.3E-07	
	Age 16 - 18 years	2.0E+01	mg/kg	4.3E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.2E-08	
	Dermal Absorption									3.E-06
	Age 9 - 16 years	2.0E+01	mg/kg	4.7E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.8E-06	
	Age 16 - 18 years	2.0E+01	mg/kg	1.3E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	2.7E-07	

Table 8.24
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	1.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	3.0E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Bismuth-212	8.5E-01	pCi/g	--	--	1.98E+04	pCi/g	4.E-11
	Bismuth-214	9.3E-01	pCi/g	--	--	6.65E+00	pCi/g	1.E-07
	Lead-212	7.3E-01	pCi/g	--	--	5.13E+02	pCi/g	1.E-09
	Lead-214	1.0E+00	pCi/g	--	--	6.64E+00	pCi/g	2.E-07
	Potassium-40	7.9E+00	pCi/g	--	--	5.70E+02	pCi/g	1.E-08
	Radium-226	1.8E+00	pCi/g	--	--	5.85E+00	pCi/g	3.E-07
	Radium-228	7.4E-01	pCi/g	--	--	1.23E+01	pCi/g	6.E-08
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	5.49E+00	pCi/g	1.E-07
Ingestion Route Total								1.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	5.4E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	1.21E+00	pCi/g	7.E-07
	Bismuth-214	9.3E-01	pCi/g	--	--	1.16E+00	pCi/g	8.E-07
	Lead-212	7.3E-01	pCi/g	--	--	1.14E+00	pCi/g	6.E-07
	Lead-214	1.0E+00	pCi/g	--	--	1.04E+00	pCi/g	1.E-06
	Potassium-40	7.9E+00	pCi/g	--	--	1.04E+01	pCi/g	8.E-07
	Radium-226	1.8E+00	pCi/g	--	--	1.03E+00	pCi/g	2.E-06
	Radium-228	7.4E-01	pCi/g	--	--	7.46E-01	pCi/g	1.E-06
	Thallium-208	2.3E-01	pCi/g	--	--	4.65E-01	pCi/g	5.E-07
	Thorium-234	7.8E-01	pCi/g	--	--	1.02E+00	pCi/g	8.E-07
Dermal Absorption Route Total								9.E-06
							Total of Receptor Risks Across All Media	1.E-05

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.25
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Freshwater Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	8.8E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Chromium (Hexavalent)	2.0E+01	mg/kg	1.6E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	8.1E-09
	Bismuth-212	8.5E-01	pCi/g	--	--	1.37E+06	pCi/g	6.E-13
	Bismuth-214	9.3E-01	pCi/g	--	--	2.97E+02	pCi/g	3.E-09
	Lead-212	7.3E-01	pCi/g	--	--	4.46E+04	pCi/g	2.E-11
	Lead-214	1.0E+00	pCi/g	--	--	2.97E+02	pCi/g	3.E-09
	Potassium-40	7.9E+00	pCi/g	--	--	4.02E+04	pCi/g	2.E-10
	Radium-226	1.8E+00	pCi/g	--	--	2.60E+02	pCi/g	7.E-09
	Radium-228	7.4E-01	pCi/g	--	--	7.28E+02	pCi/g	1.E-09
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	2.45E+02	pCi/g	3.E-09
Ingestion Route Total								4.E-08
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	1.4E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Chromium (Hexavalent)	2.0E+01	mg/kg	5.2E-10	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Bismuth-212	8.5E-01	pCi/g	--	--	3.61E+01	pCi/g	2.E-08
	Bismuth-214	9.3E-01	pCi/g	--	--	3.47E+01	pCi/g	3.E-08
	Lead-212	7.3E-01	pCi/g	--	--	3.43E+01	pCi/g	2.E-08
	Lead-214	1.0E+00	pCi/g	--	--	3.11E+01	pCi/g	3.E-08
	Potassium-40	7.9E+00	pCi/g	--	--	3.12E+02	pCi/g	3.E-08
	Radium-226	1.8E+00	pCi/g	--	--	3.10E+01	pCi/g	6.E-08
	Radium-228	7.4E-01	pCi/g	--	--	2.24E+01	pCi/g	3.E-08
	Thallium-208	2.3E-01	pCi/g	--	--	1.39E+01	pCi/g	2.E-08
	Thorium-234	7.8E-01	pCi/g	--	--	3.06E+01	pCi/g	3.E-08
Dermal Absorption Route Total								3.E-07
Inhalation								
	Arsenic	1.6E-07	mg/m^3	1.1E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	4.6E-11
	Chromium (Hexavalent)	1.8E-07	mg/m^3	1.2E-11	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	1.E-09
	Manganese	1.9E-06	mg/m^3	1.2E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Bismuth-212	8.5E-01	pCi/g	--	--	3.96E+07	pCi/g	2.E-14
	Bismuth-214	9.3E-01	pCi/g	--	--	1.45E+05	pCi/g	6.E-12
	Lead-212	7.3E-01	pCi/g	--	--	6.04E+06	pCi/g	1.E-13
	Lead-214	1.0E+00	pCi/g	--	--	1.45E+05	pCi/g	7.E-12
	Potassium-40	7.9E+00	pCi/g	--	--	2.02E+07	pCi/g	4.E-13
	Radium-226	1.8E+00	pCi/g	--	--	7.57E+04	pCi/g	2.E-11
	Radium-228	7.4E-01	pCi/g	--	--	2.38E+04	pCi/g	3.E-11
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	3.70E+04	pCi/g	2.E-11
Inhalation Route Total								1.E-09
							Total of Receptor Risks Across All Media	3.E-07

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhalation Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.26
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Freshwater Wetland Sediment
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Arsenic	1.8E+01	mg/kg	6.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.26a for Mutagenic Risks				3.E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	1.24E+04	pCi/g	7.E-11
	Bismuth-214	9.3E-01	pCi/g	--	--	4.15E+00	pCi/g	2.E-07
	Lead-212	7.3E-01	pCi/g	--	--	3.21E+02	pCi/g	2.E-09
	Lead-214	1.0E+00	pCi/g	--	--	4.15E+00	pCi/g	3.E-07
	Potassium-40	7.9E+00	pCi/g	--	--	3.56E+02	pCi/g	2.E-08
	Radium-226	1.8E+00	pCi/g	--	--	3.66E+00	pCi/g	5.E-07
	Radium-228	7.4E-01	pCi/g	--	--	7.67E+00	pCi/g	1.E-07
	Thallium-208	2.3E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	7.8E-01	pCi/g	--	--	3.43E+00	pCi/g	2.E-07
Ingestion Route Total								5.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Arsenic	1.8E+01	mg/kg	2.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Chromium (Hexavalent)	2.0E+01	mg/kg	See Table 8.26a for Mutagenic Risks				6.E-06
	Bismuth-212	8.5E-01	pCi/g	--	--	9.27E-01	pCi/g	9.E-07
	Bismuth-214	9.3E-01	pCi/g	--	--	8.91E-01	pCi/g	1.E-06
	Lead-212	7.3E-01	pCi/g	--	--	8.78E-01	pCi/g	8.E-07
	Lead-214	1.0E+00	pCi/g	--	--	7.97E-01	pCi/g	1.E-06
	Potassium-40	7.9E+00	pCi/g	--	--	8.01E+00	pCi/g	1.E-06
	Radium-226	1.8E+00	pCi/g	--	--	7.95E-01	pCi/g	2.E-06
	Radium-228	7.4E-01	pCi/g	--	--	5.74E-01	pCi/g	1.E-06
	Thallium-208	2.3E-01	pCi/g	--	--	3.58E-01	pCi/g	6.E-07
	Thorium-234	7.8E-01	pCi/g	--	--	7.84E-01	pCi/g	1.E-06
Dermal Absorption Route Total								2.E-05
							Total of Receptor Hazards Across All Media	2.E-05

Notes:

For radiological COPCs, the fraction exposed values presented in Tables 4.1 through 4.32 were applied to the PRGs shown in the Cancer Slope Factor/Inhala Unit Risk column. Radiological PRGs were calculated using EPA's calculator and PDF output files are included as an attachment to the HHRA.

Dabs from EPA 2004 (RAGS, Part E). If none available in RAGS Part E, used default values from EPA Region 3.

Table 8.26a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									3.E-06
	Age 0 -2 years	2.0E+01	mg/kg	3.2E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.6E-06	
	Age 2 - 6 years	2.0E+01	mg/kg	6.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	9.5E-07	
	Age 6 - 16 years	2.0E+01	mg/kg	1.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.2E-07	
	Age 16 - 26 years	2.0E+01	mg/kg	1.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	7.4E-08	
	Dermal Absorption									6.E-06
	Age 0 -2 years	2.0E+01	mg/kg	1.1E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	2.2E-06	
	Age 2 - 6 years	2.0E+01	mg/kg	2.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	1.3E-06	
	Age 6 - 16 years	2.0E+01	mg/kg	2.7E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	1.6E-06	
	Age 16 - 26 years	2.0E+01	mg/kg	2.7E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	5.4E-07	

Table 8.27
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.27a for mutagenic calculations				2.E-07
	Arsenic	1.4E+01	mg/kg	3.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.27a for mutagenic calculations				4.E-05
	Cobalt	1.7E+02	mg/kg	8.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	7.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	4.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.1E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	3.31E+04	pCi/g	4.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	1.11E+01	pCi/g	6.E-08
	Cesium-137	1.9E-01	pCi/g	--	--	1.31E+03	pCi/g	1.E-10
	Lead-212	9.5E-01	pCi/g	--	--	8.55E+02	pCi/g	1.E-09
	Lead-214	8.1E-01	pCi/g	--	--	1.11E+01	pCi/g	7.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	9.50E+02	pCi/g	2.E-08
	Radium-228	1.0E+00	pCi/g	--	--	2.04E+01	pCi/g	5.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								4.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.27a for mutagenic calculations				7.E-08
	Arsenic	1.4E+01	mg/kg	6.9E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.27a for mutagenic calculations				6.E-05
	Cobalt	1.7E+02	mg/kg	2.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	2.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	2.3E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.2E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	3.71E+00	pCi/g	3.E-07
	Bismuth-214	7.0E-01	pCi/g	--	--	3.51E+00	pCi/g	2.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	1.05E+01	pCi/g	2.E-08
	Lead-212	9.5E-01	pCi/g	--	--	3.49E+00	pCi/g	3.E-07
	Lead-214	8.1E-01	pCi/g	--	--	3.10E+00	pCi/g	3.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.25E+01	pCi/g	5.E-07
	Radium-228	1.0E+00	pCi/g	--	--	2.25E+00	pCi/g	5.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	1.44E+00	pCi/g	2.E-07
Dermal Absorption Route Total								6.E-05
							Total of Receptor Risks Across All Media	1.E-04

Table 8.27a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									2.E-07
	Age 0 - 2 years	6.1E-01	mg/kg	9.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	9.6E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	1.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.8E-08	
	Dermal Absorption									7.E-08
	Age 0 - 2 years	6.1E-01	mg/kg	4.4E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	4.4E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	8.9E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.7E-08	
Chromium	Ingestion									4.E-05
	Age 0 - 2 years	3.2E+02	mg/kg	5.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.5E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	1.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.5E-05	
	Dermal Absorption									6.E-05
	Age 0 - 2 years	3.2E+02	mg/kg	1.8E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.6E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	3.6E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.1E-05	

Table 8.28
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.28a for mutagenic calculations				2.E-08
	Arsenic	1.4E+01	mg/kg	8.0E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.28a for mutagenic calculations				4.E-06
	Cobalt	1.7E+02	mg/kg	1.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	9.3E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.3E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	4.41E+04	pCi/g	3.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	1.48E+01	pCi/g	5.E-08
	Cesium-137	1.9E-01	pCi/g	--	--	1.74E+03	pCi/g	1.E-10
	Lead-212	9.5E-01	pCi/g	--	--	1.14E+03	pCi/g	8.E-10
	Lead-214	8.1E-01	pCi/g	--	--	1.48E+01	pCi/g	5.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	1.27E+03	pCi/g	1.E-08
	Radium-228	1.0E+00	pCi/g	--	--	2.73E+01	pCi/g	4.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								4.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.28a for mutagenic calculations				6.E-08
	Arsenic	1.4E+01	mg/kg	1.2E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.28a for mutagenic calculations				5.E-05
	Cobalt	1.7E+02	mg/kg	5.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	5.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	4.0E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.1E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	2.48E+00	pCi/g	5.E-07
	Bismuth-214	7.0E-01	pCi/g	--	--	2.34E+00	pCi/g	3.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	6.99E+00	pCi/g	3.E-08
	Lead-212	9.5E-01	pCi/g	--	--	2.33E+00	pCi/g	4.E-07
	Lead-214	8.1E-01	pCi/g	--	--	2.07E+00	pCi/g	4.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	2.17E+01	pCi/g	7.E-07
	Radium-228	1.0E+00	pCi/g	--	--	1.50E+00	pCi/g	7.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	9.57E-01	pCi/g	3.E-07
Dermal Absorption Route Total								5.E-05
							Total of Receptor Risks Across All Media	6.E-05

Table 8.28a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									2.E-08
	Age 9 - 16 years	6.1E-01	mg/kg	4.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.4E-08	
	Age 16 - 18 years	6.1E-01	mg/kg	1.3E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.3E-09	
	Dermal Absorption									6.E-08
	Age 9 - 16 years	6.1E-01	mg/kg	1.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.5E-08	
	Age 16 - 18 years	6.1E-01	mg/kg	5.3E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.3E-09	
Chromium	Ingestion									4.E-06
	Age 9 - 16 years	3.2E+02	mg/kg	2.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.6E-06	
	Age 16 - 18 years	3.2E+02	mg/kg	6.9E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	3.5E-07	
	Dermal Absorption									5.E-05
	Age 9 - 16 years	3.2E+02	mg/kg	7.4E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.4E-05	
	Age 16 - 18 years	3.2E+02	mg/kg	2.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	4.2E-06	

Table 8.29
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	9.0E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-09
	Arsenic	1.4E+01	mg/kg	1.2E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	4.7E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Cobalt	1.7E+02	mg/kg	2.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	2.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	1.4E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.5E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.98E+04	pCi/g	6.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	6.65E+00	pCi/g	1.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	7.83E+02	pCi/g	2.E-10
	Lead-212	9.5E-01	pCi/g	--	--	5.13E+02	pCi/g	2.E-09
	Lead-214	8.1E-01	pCi/g	--	--	6.64E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	5.70E+02	pCi/g	3.E-08
	Radium-228	1.0E+00	pCi/g	--	--	1.23E+01	pCi/g	8.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								3.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	2.1E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Arsenic	1.4E+01	mg/kg	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	8.5E-07	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Cobalt	1.7E+02	mg/kg	4.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	4.5E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	3.6E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.9E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.11E+00	pCi/g	1.E-06
	Bismuth-214	7.0E-01	pCi/g	--	--	1.05E+00	pCi/g	7.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	3.15E+00	pCi/g	6.E-08
	Lead-212	9.5E-01	pCi/g	--	--	1.05E+00	pCi/g	9.E-07
	Lead-214	8.1E-01	pCi/g	--	--	9.30E-01	pCi/g	9.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	9.75E+00	pCi/g	2.E-06
	Radium-228	1.0E+00	pCi/g	--	--	6.75E-01	pCi/g	2.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	4.31E-01	pCi/g	7.E-07
Dermal Absorption Route Total								3.E-05
							Total of Receptor Risks Across All Media	3.E-05

Table 8.30
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.30a for mutagenic calculations				2.E-07
	Arsenic	1.4E+01	mg/kg	7.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.30a for mutagenic calculations				4.E-05
	Cobalt	1.7E+02	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	9.0E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-06
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.2E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	1.65E+04	pCi/g	7.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	5.54E+00	pCi/g	1.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	6.53E+02	pCi/g	3.E-10
	Lead-212	9.5E-01	pCi/g	--	--	4.28E+02	pCi/g	2.E-09
	Lead-214	8.1E-01	pCi/g	--	--	5.54E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	4.75E+02	pCi/g	3.E-08
	Radium-228	1.0E+00	pCi/g	--	--	1.02E+01	pCi/g	1.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								4.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.30a for mutagenic calculations				7.E-08
	Arsenic	1.4E+01	mg/kg	1.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.30a for mutagenic calculations				6.E-05
	Cobalt	1.7E+02	mg/kg	5.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	5.6E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	4.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.86E+00	pCi/g	6.E-07
	Bismuth-214	7.0E-01	pCi/g	--	--	1.76E+00	pCi/g	4.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	5.24E+00	pCi/g	4.E-08
	Lead-212	9.5E-01	pCi/g	--	--	1.74E+00	pCi/g	5.E-07
	Lead-214	8.1E-01	pCi/g	--	--	1.55E+00	pCi/g	5.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.62E+01	pCi/g	9.E-07
	Radium-228	1.0E+00	pCi/g	--	--	1.12E+00	pCi/g	9.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	7.18E-01	pCi/g	4.E-07
Dermal Absorption Route Total								6.E-05
							Total of Receptor Risks Across All Media	1.E-04

Table 8.30a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									3.E-07
	Age 0 -2 years	6.1E-01	mg/kg	1.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.9E-07	
	Age 2 - 6 years	6.1E-01	mg/kg	3.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.2E-07	
	Dermal Absorption									1.E-07
	Age 0 -2 years	6.1E-01	mg/kg	8.9E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	8.9E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	1.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.3E-08	
Chromium	Ingestion									8.E-05
	Age 0 -2 years	3.2E+02	mg/kg	1.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	5.0E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	2.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.0E-05	
	Dermal Absorption									1.E-04
	Age 0 -2 years	3.2E+02	mg/kg	3.6E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	7.1E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	7.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.3E-05	

Table 8.31
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.31a for mutagenic calculations				2.E-08
	Arsenic	1.4E+01	mg/kg	1.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.31a for mutagenic calculations				4.E-06
	Cobalt	1.7E+02	mg/kg	3.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	3.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	1.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	4.6E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	2.20E+04	pCi/g	5.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	7.38E+00	pCi/g	9.E-08
	Cesium-137	1.9E-01	pCi/g	--	--	8.70E+02	pCi/g	2.E-10
	Lead-212	9.5E-01	pCi/g	--	--	5.70E+02	pCi/g	2.E-09
	Lead-214	8.1E-01	pCi/g	--	--	7.38E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	6.34E+02	pCi/g	2.E-08
	Radium-228	1.0E+00	pCi/g	--	--	1.36E+01	pCi/g	8.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								5.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.31a for mutagenic calculations				6.E-08
	Arsenic	1.4E+01	mg/kg	2.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.31a for mutagenic calculations				5.E-05
	Cobalt	1.7E+02	mg/kg	1.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	8.0E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-06
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	4.2E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.24E+00	pCi/g	9.E-07
	Bismuth-214	7.0E-01	pCi/g	--	--	1.17E+00	pCi/g	6.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	3.50E+00	pCi/g	5.E-08
	Lead-212	9.5E-01	pCi/g	--	--	1.16E+00	pCi/g	8.E-07
	Lead-214	8.1E-01	pCi/g	--	--	1.03E+00	pCi/g	8.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.08E+01	pCi/g	1.E-06
	Radium-228	1.0E+00	pCi/g	--	--	7.50E-01	pCi/g	1.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	4.79E-01	pCi/g	7.E-07
Dermal Absorption Route Total								6.E-05
							Total of Receptor Risks Across All Media	6.E-05

Table 8.31a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									3.E-08
	Age 9 - 16 years	6.1E-01	mg/kg	9.2E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.8E-08	
	Age 16 - 18 years	6.1E-01	mg/kg	2.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.6E-09	
	Dermal Absorption									1.E-07
	Age 9 - 16 years	6.1E-01	mg/kg	3.7E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.1E-07	
	Age 16 - 18 years	6.1E-01	mg/kg	1.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.1E-08	
Chromium	Ingestion									8.E-06
	Age 9 - 16 years	3.2E+02	mg/kg	4.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	7.3E-06	
	Age 16 - 18 years	3.2E+02	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	6.9E-07	
	Dermal Absorption									1.E-04
	Age 9 - 16 years	3.2E+02	mg/kg	1.5E-06	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	8.9E-05	
	Age 16 - 18 years	3.2E+02	mg/kg	4.2E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	8.5E-06	

Table 8.32
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.8E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Arsenic	1.4E+01	mg/kg	2.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	9.4E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	5.E-06
	Cobalt	1.7E+02	mg/kg	5.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	4.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	2.8E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	7.0E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	9.92E+03	pCi/g	1.E-10
	Bismuth-214	7.0E-01	pCi/g	--	--	3.32E+00	pCi/g	2.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	3.92E+02	pCi/g	5.E-10
	Lead-212	9.5E-01	pCi/g	--	--	2.57E+02	pCi/g	4.E-09
	Lead-214	8.1E-01	pCi/g	--	--	3.32E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	2.85E+02	pCi/g	5.E-08
	Radium-228	1.0E+00	pCi/g	--	--	6.13E+00	pCi/g	2.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								6.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	4.2E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-08
	Arsenic	1.4E+01	mg/kg	2.2E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	1.7E-06	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	3.E-05
	Cobalt	1.7E+02	mg/kg	9.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	8.9E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	7.2E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	3.8E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	5.57E-01	pCi/g	2.E-06
	Bismuth-214	7.0E-01	pCi/g	--	--	5.27E-01	pCi/g	1.E-06
	Cesium-137	1.9E-01	pCi/g	--	--	1.57E+00	pCi/g	1.E-07
	Lead-212	9.5E-01	pCi/g	--	--	5.23E-01	pCi/g	2.E-06
	Lead-214	8.1E-01	pCi/g	--	--	4.65E-01	pCi/g	2.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	4.87E+00	pCi/g	3.E-06
	Radium-228	1.0E+00	pCi/g	--	--	3.37E-01	pCi/g	3.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	2.15E-01	pCi/g	1.E-06
Dermal Absorption Route Total								5.E-05
							Total of Receptor Hazards Across All Media	6.E-05

Table 8.33
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Paradise Creek
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	4.9E-10	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-10
	Arsenic	1.4E+01	mg/kg	6.6E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Chromium (Hexavalent)	3.2E+02	mg/kg	2.6E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Cobalt	1.7E+02	mg/kg	1.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	7.8E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-08
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.9E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Bismuth-212	1.2E+00	pCi/g	--	--	1.37E+06	pCi/g	9.E-13
	Bismuth-214	7.0E-01	pCi/g	--	--	2.97E+02	pCi/g	2.E-09
	Cesium-137	1.9E-01	pCi/g	--	--	1.91E+04	pCi/g	1.E-11
	Lead-212	9.5E-01	pCi/g	--	--	4.46E+04	pCi/g	2.E-11
	Lead-214	8.1E-01	pCi/g	--	--	2.97E+02	pCi/g	3.E-09
	Potassium-40	1.5E+01	pCi/g	--	--	4.02E+04	pCi/g	4.E-10
	Radium-228	1.0E+00	pCi/g	--	--	7.28E+02	pCi/g	1.E-09
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								2.E-07
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	2.1E-10	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-10
	Arsenic	1.4E+01	mg/kg	1.1E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Chromium (Hexavalent)	3.2E+02	mg/kg	8.3E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Cobalt	1.7E+02	mg/kg	4.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	4.4E-11	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	3.5E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-09
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.9E-15	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-10
	Bismuth-212	1.2E+00	pCi/g	--	--	3.34E+01	pCi/g	4.E-08
	Bismuth-214	7.0E-01	pCi/g	--	--	3.16E+01	pCi/g	2.E-08
	Cesium-137	1.9E-01	pCi/g	--	--	9.44E+01	pCi/g	2.E-09
	Lead-212	9.5E-01	pCi/g	--	--	3.14E+01	pCi/g	3.E-08
	Lead-214	8.1E-01	pCi/g	--	--	2.79E+01	pCi/g	3.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	2.92E+02	pCi/g	5.E-08
	Radium-228	1.0E+00	pCi/g	--	--	2.02E+01	pCi/g	5.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	1.29E+01	pCi/g	2.E-08
Dermal Absorption Route Total								4.E-07
Inhalation								
	Chromium (Total)	2.9E-06	mg/m^3	1.9E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cobalt	1.5E-06	mg/m^3	1.0E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	9.E-10
	Mercury	3.5E-04	mg/m^3	2.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
Inhalation Route Total								9.E-10
							Total of Receptor Risks Across All Media	6.E-07

Table 8.34
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Dock Construction Project within Paradise Creek
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	4.5E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Arsenic	1.4E+01	mg/kg	6.0E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	9.E-08
	Chromium (Hexavalent)	3.2E+02	mg/kg	2.3E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Cobalt	1.7E+02	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	7.0E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-08
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.7E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.52E+05	pCi/g	8.E-12
	Bismuth-214	7.0E-01	pCi/g	--	--	3.30E+01	pCi/g	2.E-08
	Cesium-137	1.9E-01	pCi/g	--	--	2.12E+03	pCi/g	9.E-11
	Lead-212	9.5E-01	pCi/g	--	--	4.96E+03	pCi/g	2.E-10
	Lead-214	8.1E-01	pCi/g	--	--	3.30E+01	pCi/g	2.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	4.47E+03	pCi/g	3.E-09
	Radium-228	1.0E+00	pCi/g	--	--	8.09E+01	pCi/g	1.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								1.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	1.9E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Arsenic	1.4E+01	mg/kg	9.6E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Chromium (Hexavalent)	3.2E+02	mg/kg	7.5E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Cobalt	1.7E+02	mg/kg	4.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	3.9E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	3.1E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-08
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.7E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Bismuth-212	1.2E+00	pCi/g	--	--	3.71E+00	pCi/g	3.E-07
	Bismuth-214	7.0E-01	pCi/g	--	--	3.51E+00	pCi/g	2.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	1.05E+01	pCi/g	2.E-08
	Lead-212	9.5E-01	pCi/g	--	--	3.49E+00	pCi/g	3.E-07
	Lead-214	8.1E-01	pCi/g	--	--	3.10E+00	pCi/g	3.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.25E+01	pCi/g	5.E-07
	Radium-228	1.0E+00	pCi/g	--	--	2.25E+00	pCi/g	5.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	1.44E+00	pCi/g	2.E-07
Dermal Absorption Route Total								4.E-06
Inhalation								
	Chromium (Total)	2.9E-06	mg/m^3	1.7E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cobalt	1.5E-06	mg/m^3	9.0E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	8.E-09
	Mercury	3.5E-04	mg/m^3	2.0E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
Inhalation Route Total								8.E-09
							Total of Receptor Risks Across All Media	5.E-06

Table 8.35
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.35a for Mutagenic Risks				3.E-07
	Arsenic	1.4E+01	mg/kg	1.0E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.35a for Mutagenic Risks				9.E-05
	Cobalt	1.7E+02	mg/kg	2.1E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	2.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	1.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.5E-06
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	2.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	6.20E+03	pCi/g	2.E-10
	Bismuth-214	7.0E-01	pCi/g	--	--	2.08E+00	pCi/g	3.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	2.45E+02	pCi/g	7.8E-10
	Lead-212	9.5E-01	pCi/g	--	--	1.60E+02	pCi/g	6.E-09
	Lead-214	8.1E-01	pCi/g	--	--	2.08E+00	pCi/g	4.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.78E+02	pCi/g	8.E-08
	Radium-228	1.0E+00	pCi/g	--	--	3.83E+00	pCi/g	3.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								9.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.35a for Mutagenic Risks				2.E-07
	Arsenic	1.4E+01	mg/kg	3.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.35a for Mutagenic Risks				2.E-04
	Cobalt	1.7E+02	mg/kg	1.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	1.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	6.2E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	4.28E-01	pCi/g	3.E-06
	Bismuth-214	7.0E-01	pCi/g	--	--	4.05E-01	pCi/g	2.E-06
	Cesium-137	1.9E-01	pCi/g	--	--	1.21E+00	pCi/g	2.E-07
	Lead-212	9.5E-01	pCi/g	--	--	4.03E-01	pCi/g	2.E-06
	Lead-214	8.1E-01	pCi/g	--	--	3.58E-01	pCi/g	2.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	3.75E+00	pCi/g	4.E-06
	Radium-228	1.0E+00	pCi/g	--	--	2.59E-01	pCi/g	4.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	1.66E-01	pCi/g	2.E-06
Dermal Absorption Route Total								2.E-04
							Total of Receptor Risks Across All Media	3.E-04

Table 8.35a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									3.E-07
	Age 0 -2 years	6.1E-01	mg/kg	1.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.9E-07	
	Age 2 - 6 years	6.1E-01	mg/kg	3.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.2E-07	
	Age 6 - 16 years	6.1E-01	mg/kg	9.0E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.7E-08	
	Age 16 - 26 years	6.1E-01	mg/kg	9.0E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	9.0E-09	
	Dermal Absorption									2.E-07
	Age 0 -2 years	6.1E-01	mg/kg	8.9E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	8.9E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	1.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.3E-08	
	Age 6 - 16 years	6.1E-01	mg/kg	2.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	6.3E-08	
	Age 16 - 26 years	6.1E-01	mg/kg	2.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.1E-08	
Chromium	Ingestion									9.E-05
	Age 0 -2 years	3.2E+02	mg/kg	1.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	5.0E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	2.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.0E-05	
	Age 6 - 16 years	3.2E+02	mg/kg	4.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	7.1E-06	
	Age 16 - 26 years	3.2E+02	mg/kg	4.7E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.4E-06	
	Dermal Absorption									2.E-04
	Age 0 -2 years	3.2E+02	mg/kg	3.6E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	7.1E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	7.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.3E-05	
	Age 6 - 16 years	3.2E+02	mg/kg	8.5E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	5.1E-05	
	Age 16 - 26 years	3.2E+02	mg/kg	8.5E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.7E-05	

Table 8.36
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Paradise Creek Sediment
Exposure Medium: Sediment
Exposure Point: Paradise Creek Sediment
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening values (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.36a for Mutagenic Risks				2.E-07
	Arsenic	1.4E+01	mg/kg	5.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.E-07
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.36a for Mutagenic Risks				4.E-05
	Cobalt	1.7E+02	mg/kg	1.1E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	1.0E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	5.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.7E-07
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	1.24E+04	pCi/g	9.E-11
	Bismuth-214	7.0E-01	pCi/g	--	--	4.15E+00	pCi/g	2.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	4.90E+02	pCi/g	3.9E-10
	Lead-212	9.5E-01	pCi/g	--	--	3.21E+02	pCi/g	3.E-09
	Lead-214	8.1E-01	pCi/g	--	--	4.15E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.56E+02	pCi/g	4.E-08
	Radium-228	1.0E+00	pCi/g	--	--	7.67E+00	pCi/g	1.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								5.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)pyrene	6.1E-01	mg/kg	See Table 8.36a for Mutagenic Risks				3.E-07
	Arsenic	1.4E+01	mg/kg	7.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Hexavalent)	3.2E+02	mg/kg	See Table 8.36a for Mutagenic Risks				3.E-04
	Cobalt	1.7E+02	mg/kg	3.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.7E+00	mg/kg	2.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.6E-05	mg/kg	2.3E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-06
	2,3,7,8-TCDD TEQ	2.4E-05	mg/kg	1.2E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	8.57E-01	pCi/g	1.E-06
	Bismuth-214	7.0E-01	pCi/g	--	--	8.11E-01	pCi/g	9.E-07
	Cesium-137	1.9E-01	pCi/g	--	--	2.42E+00	pCi/g	8.E-08
	Lead-212	9.5E-01	pCi/g	--	--	8.05E-01	pCi/g	1.E-06
	Lead-214	8.1E-01	pCi/g	--	--	7.16E-01	pCi/g	1.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	7.50E+00	pCi/g	2.E-06
	Radium-228	1.0E+00	pCi/g	--	--	5.19E-01	pCi/g	2.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	3.31E-01	pCi/g	1.E-06
Dermal Absorption Route Total								3.E-04
							Total of Receptor Risks Across All Media	3.E-04

Table 8.36a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)pyrene	Ingestion									2.E-07
	Age 0 -2 years	6.1E-01	mg/kg	9.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	9.6E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	1.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.8E-08	
	Age 6 - 16 years	6.1E-01	mg/kg	4.5E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.3E-08	
	Age 16 - 26 years	6.1E-01	mg/kg	4.5E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	4.5E-09	
	Dermal Absorption									3.E-07
	Age 0 -2 years	6.1E-01	mg/kg	4.4E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	4.4E-08	
	Age 2 - 6 years	6.1E-01	mg/kg	8.9E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.7E-08	
	Age 6 - 16 years	6.1E-01	mg/kg	6.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.9E-07	
	Age 16 - 26 years	6.1E-01	mg/kg	6.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	6.2E-08	
Chromium	Ingestion									4.E-05
	Age 0 -2 years	3.2E+02	mg/kg	5.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.5E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	1.0E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.5E-05	
	Age 6 - 16 years	3.2E+02	mg/kg	2.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.5E-06	
	Age 16 - 26 years	3.2E+02	mg/kg	2.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	1.2E-06	
	Dermal Absorption									3.E-04
	Age 0 -2 years	3.2E+02	mg/kg	1.8E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.6E-05	
	Age 2 - 6 years	3.2E+02	mg/kg	3.6E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.1E-05	
	Age 6 - 16 years	3.2E+02	mg/kg	2.5E-06	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	1.5E-04	
	Age 16 - 26 years	3.2E+02	mg/kg	2.5E-06	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	5.0E-05	

Table 8.37
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.37a for mutagenic calculations				5.4E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.37a for mutagenic calculations				4.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.37a for mutagenic calculations				4.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.37a for mutagenic calculations				1.E-06
	Aroclor 1248	5.6E+00	mg/kg	2.6E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Aroclor 1254	1.3E+00	mg/kg	6.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Aroclor 1260	1.6E+00	mg/kg	7.5E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Antimony	3.9E+01	mg/kg	1.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	6.5E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Total)	5.1E+03	mg/kg	2.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.37a for mutagenic calculations				6.E-06
	Cobalt	4.3E+03	mg/kg	2.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	2.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	2.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	2.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	3.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	4.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	1.6E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	3.31E+04	pCi/g	4.E-11
	Bismuth-214	6.2E-01	pCi/g	--	--	1.11E+01	pCi/g	6.E-08
	Lead-212	9.8E-01	pCi/g	--	--	8.55E+02	pCi/g	1.E-09
	Lead-214	7.3E-01	pCi/g	--	--	1.11E+01	pCi/g	7.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	9.50E+02	pCi/g	2.E-08
	Radium-226	9.9E-01	pCi/g	--	--	9.76E+00	pCi/g	1.E-07
	Radium-228	9.8E-01	pCi/g	--	--	2.04E+01	pCi/g	5.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								9.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.37a for mutagenic calculations				3.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.37a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.37a for mutagenic calculations				2.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.37a for mutagenic calculations				5.E-07
	Aroclor 1248	5.6E+00	mg/kg	1.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Aroclor 1254	1.3E+00	mg/kg	3.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-08
	Aroclor 1260	1.6E+00	mg/kg	3.8E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-08
	Antimony	3.9E+01	mg/kg	6.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.2E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Total)	5.1E+03	mg/kg	8.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.37a for mutagenic calculations				8.E-06
	Cobalt	4.3E+03	mg/kg	7.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	8.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	9.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	1.7E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	3.71E+00	pCi/g	3.E-07
	Bismuth-214	6.2E-01	pCi/g	--	--	3.51E+00	pCi/g	2.E-07
	Lead-212	9.8E-01	pCi/g	--	--	3.49E+00	pCi/g	3.E-07
	Lead-214	7.3E-01	pCi/g	--	--	3.10E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.25E+01	pCi/g	5.E-07
	Radium-226	9.9E-01	pCi/g	--	--	3.09E+00	pCi/g	3.E-07
	Radium-228	9.8E-01	pCi/g	--	--	2.25E+00	pCi/g	4.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	1.44E+00	pCi/g	2.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	2.E-05

Table 8.37a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									5.E-08
	Age 0 -2 years	2.2E+00	mg/kg	3.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.4E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	6.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.0E-08	
	Dermal Absorption									3.E-08
	Age 0 -2 years	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.6E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	3.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	9.4E-09	
Benzo(a)pyrene	Ingestion									4.E-07
	Age 0 -2 years	1.7E+00	mg/kg	2.7E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.7E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.6E-07	
	Dermal Absorption									2.E-07
	Age 0 -2 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.2E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.4E-08	
Benzo(b)fluoranthene	Ingestion									4.E-08
	Age 0 -2 years	1.7E+00	mg/kg	2.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.6E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	5.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.6E-08	
	Dermal Absorption									2.E-08
	Age 0 -2 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.2E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	2.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.3E-09	
Dibenzo(a.h)anthracene	Ingestion									1.E-06
	Age 0 -2 years	4.0E+00	mg/kg	6.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	6.3E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	1.3E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.8E-07	
	Dermal Absorption									5.E-07
	Age 0 -2 years	4.0E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.9E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	5.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.7E-07	
Chromium	Ingestion									6.E-06
	Age 0 -2 years	4.5E+01	mg/kg	7.0E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	3.5E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.1E-06	
	Dermal Absorption									8.E-06
	Age 0 -2 years	4.5E+01	mg/kg	2.5E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	5.0E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	5.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.0E-06	

Table 8.38
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.38a for mutagenic calculations				5.E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.38a for mutagenic calculations				4.E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.38a for mutagenic calculations				4.E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.38a for mutagenic calculations				1.E-07
	Aroclor 1248	5.6E+00	mg/kg	5.4E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Aroclor 1254	1.3E+00	mg/kg	1.2E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Aroclor 1260	1.6E+00	mg/kg	1.6E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Antimony	3.9E+01	mg/kg	3.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Total)	5.1E+03	mg/kg	4.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.38a for mutagenic calculations				6.E-07
	Cobalt	4.3E+03	mg/kg	4.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	6.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	4.8E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	5.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	6.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	8.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	3.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	4.41E+04	pCi/g	3.E-11
	Bismuth-214	6.2E-01	pCi/g	--	--	1.48E+01	pCi/g	4.E-08
	Lead-212	9.8E-01	pCi/g	--	--	1.14E+03	pCi/g	9.E-10
	Lead-214	7.3E-01	pCi/g	--	--	1.48E+01	pCi/g	5.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	1.27E+03	pCi/g	1.E-08
	Radium-226	9.9E-01	pCi/g	--	--	1.30E+01	pCi/g	8.E-08
	Radium-228	9.8E-01	pCi/g	--	--	2.73E+01	pCi/g	4.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								1.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.38a for mutagenic calculations				2.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.38a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.38a for mutagenic calculations				2.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.38a for mutagenic calculations				4.E-07
	Aroclor 1248	5.6E+00	mg/kg	2.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Aroclor 1254	1.3E+00	mg/kg	5.3E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Aroclor 1260	1.6E+00	mg/kg	6.7E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Antimony	3.9E+01	mg/kg	1.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	2.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Chromium (Total)	5.1E+03	mg/kg	1.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.38a for mutagenic calculations				7.E-06
	Cobalt	4.3E+03	mg/kg	1.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	2.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	2.7E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	3.1E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	2.48E+00	pCi/g	5.E-07
	Bismuth-214	6.2E-01	pCi/g	--	--	2.34E+00	pCi/g	3.E-07
	Lead-212	9.8E-01	pCi/g	--	--	2.33E+00	pCi/g	4.E-07
	Lead-214	7.3E-01	pCi/g	--	--	2.07E+00	pCi/g	4.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	2.17E+01	pCi/g	7.E-07
	Radium-226	9.9E-01	pCi/g	--	--	2.06E+00	pCi/g	5.E-07
	Radium-228	9.8E-01	pCi/g	--	--	1.50E+00	pCi/g	7.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	9.57E-01	pCi/g	3.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	1.E-05

Table 8.38a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									5.E-09
	Age 9 - 16 years	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.9E-09	
	Age 16 - 18 years	2.2E+00	mg/kg	4.6E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	4.6E-10	
	Dermal Absorption									2.E-08
	Age 9 - 16 years	2.2E+00	mg/kg	6.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.9E-08	
	Age 16 - 18 years	2.2E+00	mg/kg	1.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.8E-09	
Benzo(a)pyrene	Ingestion									4.E-08
	Age 9 - 16 years	1.7E+00	mg/kg	1.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.8E-08	
	Age 16 - 18 years	1.7E+00	mg/kg	3.7E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	3.7E-09	
	Dermal Absorption									2.E-07
	Age 9 - 16 years	1.7E+00	mg/kg	5.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.5E-07	
	Age 16 - 18 years	1.7E+00	mg/kg	1.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.5E-08	
Benzo(b)fluoranthene	Ingestion									4.E-09
	Age 9 - 16 years	1.7E+00	mg/kg	1.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.8E-09	
	Age 16 - 18 years	1.7E+00	mg/kg	3.6E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	3.6E-10	
	Dermal Absorption									2.E-08
	Age 9 - 16 years	1.7E+00	mg/kg	5.0E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.5E-08	
	Age 16 - 18 years	1.7E+00	mg/kg	1.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.4E-09	
Dibenzo(a.h)anthracene	Ingestion									1.E-07
	Age 9 - 16 years	4.0E+00	mg/kg	3.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	9.0E-08	
	Age 16 - 18 years	4.0E+00	mg/kg	8.6E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	8.6E-09	
	Dermal Absorption									4.E-07
	Age 9 - 16 years	4.0E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.6E-07	
	Age 16 - 18 years	4.0E+00	mg/kg	3.4E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	3.4E-08	
Chromium	Ingestion									6.E-07
	Age 9 - 16 years	4.5E+01	mg/kg	3.4E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.0E-07	
	Age 16 - 18 years	4.5E+01	mg/kg	9.6E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	4.8E-08	
	Dermal Absorption									7.E-06
	Age 9 - 16 years	4.5E+01	mg/kg	1.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	6.2E-06	
	Age 16 - 18 years	4.5E+01	mg/kg	2.9E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	5.9E-07	

Table 8.39
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	3.2E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	3.2E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	2.5E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	2.5E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	5.9E-08
	Aroclor 1248	5.6E+00	mg/kg	8.2E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.6E-07
	Aroclor 1254	1.3E+00	mg/kg	1.9E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.8E-08
	Aroclor 1260	1.6E+00	mg/kg	2.4E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.7E-08
	Antimony	3.9E+01	mg/kg	5.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	2.0E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.1E-07
	Chromium (Total)	5.1E+03	mg/kg	7.5E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	6.5E-07	mg/kg-day	5.0E-01	$(mg/kg-day)^{-1}$	3.3E-07
	Cobalt	4.3E+03	mg/kg	6.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	9.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	7.3E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	7.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	9.7E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	5.1E-13	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	6.6E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.98E+04	pCi/g	6.E-11
	Bismuth-214	6.2E-01	pCi/g	--	--	6.65E+00	pCi/g	9.E-08
	Lead-212	9.8E-01	pCi/g	--	--	5.13E+02	pCi/g	2.E-09
	Lead-214	7.3E-01	pCi/g	--	--	6.64E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	5.70E+02	pCi/g	3.E-08
	Radium-226	9.9E-01	pCi/g	--	--	5.85E+00	pCi/g	2.E-07
	Radium-228	9.8E-01	pCi/g	--	--	1.23E+01	pCi/g	8.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								2.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	7.4E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	7.4E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	5.9E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	5.8E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	5.8E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.4E-07	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	1.4E-07
	Aroclor 1248	5.6E+00	mg/kg	2.1E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.2E-07
	Aroclor 1254	1.3E+00	mg/kg	4.8E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	9.6E-08
	Aroclor 1260	1.6E+00	mg/kg	6.0E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.2E-07
	Antimony	3.9E+01	mg/kg	1.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.9E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.8E-07
	Chromium (Total)	5.1E+03	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.2E-07	mg/kg-day	2.0E+01	$(mg/kg-day)^{-1}$	2.4E-06
	Cobalt	4.3E+03	mg/kg	1.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.7E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	2.4E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.8E-13	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.6E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.11E+00	pCi/g	1.E-06
	Bismuth-214	6.2E-01	pCi/g	--	--	1.05E+00	pCi/g	6.E-07
	Lead-212	9.8E-01	pCi/g	--	--	1.05E+00	pCi/g	9.E-07
	Lead-214	7.3E-01	pCi/g	--	--	9.30E-01	pCi/g	8.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	9.75E+00	pCi/g	2.E-06
	Radium-226	9.9E-01	pCi/g	--	--	9.28E-01	pCi/g	1.E-06
	Radium-228	9.8E-01	pCi/g	--	--	6.75E-01	pCi/g	1.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	4.31E-01	pCi/g	8.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	1.E-05

Table 8.40
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.40a for mutagenic calculations				5.4E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.40a for mutagenic calculations				4.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.40a for mutagenic calculations				4.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.40a for mutagenic calculations				1.E-06
	Aroclor 1248	5.6E+00	mg/kg	5.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Aroclor 1254	1.3E+00	mg/kg	1.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Aroclor 1260	1.6E+00	mg/kg	1.5E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Antimony	3.9E+01	mg/kg	3.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.3E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Chromium (Total)	5.1E+03	mg/kg	4.8E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.40a for mutagenic calculations				6.E-06
	Cobalt	4.3E+03	mg/kg	4.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	5.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	4.7E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	5.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	6.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	8.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	3.2E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	1.65E+04	pCi/g	7.E-11
	Bismuth-214	6.2E-01	pCi/g	--	--	5.54E+00	pCi/g	1.E-07
	Lead-212	9.8E-01	pCi/g	--	--	4.28E+02	pCi/g	2.E-09
	Lead-214	7.3E-01	pCi/g	--	--	5.54E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	4.75E+02	pCi/g	3.E-08
	Radium-226	9.9E-01	pCi/g	--	--	4.88E+00	pCi/g	2.E-07
	Radium-228	9.8E-01	pCi/g	--	--	1.02E+01	pCi/g	1.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								1.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.40a for mutagenic calculations				3.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.40a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.40a for mutagenic calculations				2.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.40a for mutagenic calculations				5.E-07
	Aroclor 1248	5.6E+00	mg/kg	2.6E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Aroclor 1254	1.3E+00	mg/kg	6.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Aroclor 1260	1.6E+00	mg/kg	7.5E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Antimony	3.9E+01	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	2.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Chromium (Total)	5.1E+03	mg/kg	1.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.40a for mutagenic calculations				8.E-06
	Cobalt	4.3E+03	mg/kg	1.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	2.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.7E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	2.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	3.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	3.5E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.86E+00	pCi/g	6.E-07
	Bismuth-214	6.2E-01	pCi/g	--	--	1.76E+00	pCi/g	4.E-07
	Lead-212	9.8E-01	pCi/g	--	--	1.74E+00	pCi/g	6.E-07
	Lead-214	7.3E-01	pCi/g	--	--	1.55E+00	pCi/g	5.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.62E+01	pCi/g	9.E-07
	Radium-226	9.9E-01	pCi/g	--	--	1.55E+00	pCi/g	6.E-07
	Radium-228	9.8E-01	pCi/g	--	--	1.12E+00	pCi/g	9.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	7.18E-01	pCi/g	5.E-07
Dermal Absorption Route Total								1.E-05
							Total of Receptor Risks Across All Media	3.E-05

Table 8.40a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									1.E-07
	Age 0 -2 years	2.2E+00	mg/kg	6.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	6.8E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	1.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.1E-08	
	Dermal Absorption									5.E-08
	Age 0 -2 years	2.2E+00	mg/kg	3.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.1E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	6.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.9E-08	
Benzo(a)pyrene	Ingestion									9.E-07
	Age 0 -2 years	1.7E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.3E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.2E-07	
	Dermal Absorption									4.E-07
	Age 0 -2 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.5E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	4.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.5E-07	
Benzo(b)fluoranthene	Ingestion									8.E-08
	Age 0 -2 years	1.7E+00	mg/kg	5.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	5.2E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	1.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.1E-08	
	Dermal Absorption									4.E-08
	Age 0 -2 years	1.7E+00	mg/kg	2.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.4E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	4.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.5E-08	
Dibenzo(a.h)anthracene	Ingestion									2.E-06
	Age 0 -2 years	4.0E+00	mg/kg	1.3E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.3E-06	
	Age 2 - 6 years	4.0E+00	mg/kg	2.5E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.5E-07	
	Dermal Absorption									9.E-07
	Age 0 -2 years	4.0E+00	mg/kg	5.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.8E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.5E-07	
Chromium	Ingestion									1.E-05
	Age 0 -2 years	4.5E+01	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.0E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	2.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.2E-06	
	Dermal Absorption									2.E-05
	Age 0 -2 years	4.5E+01	mg/kg	5.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	9.9E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	9.9E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	6.0E-06	

Table 8.41
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.41a for mutagenic calculations				5.E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.41a for mutagenic calculations				4.E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.41a for mutagenic calculations				4.E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.41a for mutagenic calculations				1.E-07
	Aroclor 1248	5.6E+00	mg/kg	1.1E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Aroclor 1254	1.3E+00	mg/kg	2.5E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-08
	Aroclor 1260	1.6E+00	mg/kg	3.1E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-08
	Antimony	3.9E+01	mg/kg	7.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	2.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Chromium (Total)	5.1E+03	mg/kg	9.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.41a for mutagenic calculations				6.E-07
	Cobalt	4.3E+03	mg/kg	8.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	9.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	1.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	6.7E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	2.20E+04	pCi/g	5.E-11
	Bismuth-214	6.2E-01	pCi/g	--	--	7.38E+00	pCi/g	8.E-08
	Lead-212	9.8E-01	pCi/g	--	--	5.70E+02	pCi/g	2.E-09
	Lead-214	7.3E-01	pCi/g	--	--	7.38E+00	pCi/g	1.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	6.34E+02	pCi/g	2.E-08
	Radium-226	9.9E-01	pCi/g	--	--	6.51E+00	pCi/g	2.E-07
	Radium-228	9.8E-01	pCi/g	--	--	1.36E+01	pCi/g	7.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								2.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.41a for mutagenic calculations				2.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.41a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.41a for mutagenic calculations				2.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.41a for mutagenic calculations				4.E-07
	Aroclor 1248	5.6E+00	mg/kg	4.7E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-07
	Aroclor 1254	1.3E+00	mg/kg	1.1E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Aroclor 1260	1.6E+00	mg/kg	1.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Antimony	3.9E+01	mg/kg	2.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	4.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Chromium (Total)	5.1E+03	mg/kg	3.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.41a for mutagenic calculations				7.E-06
	Cobalt	4.3E+03	mg/kg	2.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	3.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	2.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	3.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	3.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	5.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	6.2E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.24E+00	pCi/g	1.E-06
	Bismuth-214	6.2E-01	pCi/g	--	--	1.17E+00	pCi/g	5.E-07
	Lead-212	9.8E-01	pCi/g	--	--	1.16E+00	pCi/g	8.E-07
	Lead-214	7.3E-01	pCi/g	--	--	1.03E+00	pCi/g	7.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.08E+01	pCi/g	1.E-06
	Radium-226	9.9E-01	pCi/g	--	--	1.03E+00	pCi/g	1.E-06
	Radium-228	9.8E-01	pCi/g	--	--	7.50E-01	pCi/g	1.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	4.79E-01	pCi/g	7.E-07
Dermal Absorption Route Total								2.E-05
							Total of Receptor Risks Across All Media	2.E-05

Table 8.41a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									Jan-00
	Age 9 - 16 years	2.2E+00	mg/kg	3.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	9.8E-09	
	Age 16 - 18 years	2.2E+00	mg/kg	9.3E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	9.3E-10	
	Dermal Absorption									Jan-00
	Age 9 - 16 years	2.2E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.9E-08	
	Age 16 - 18 years	2.2E+00	mg/kg	3.7E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	3.7E-09	
Benzo(a)pyrene	Ingestion									Jan-00
	Age 9 - 16 years	1.7E+00	mg/kg	2.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.7E-08	
	Age 16 - 18 years	1.7E+00	mg/kg	7.3E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	7.3E-09	
	Dermal Absorption									Jan-00
	Age 9 - 16 years	1.7E+00	mg/kg	1.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.1E-07	
	Age 16 - 18 years	1.7E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.9E-08	
Benzo(b)fluoranthene	Ingestion									Jan-00
	Age 9 - 16 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.6E-09	
	Age 16 - 18 years	1.7E+00	mg/kg	7.2E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	7.2E-10	
	Dermal Absorption									Jan-00
	Age 9 - 16 years	1.7E+00	mg/kg	1.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.0E-08	
	Age 16 - 18 years	1.7E+00	mg/kg	2.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.9E-09	
Dibenzo(a.h)anthracene	Ingestion									Jan-00
	Age 9 - 16 years	4.0E+00	mg/kg	6.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.8E-07	
	Age 16 - 18 years	4.0E+00	mg/kg	1.7E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.7E-08	
	Dermal Absorption									Jan-00
	Age 9 - 16 years	4.0E+00	mg/kg	2.4E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.2E-07	
	Age 16 - 18 years	4.0E+00	mg/kg	6.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	6.9E-08	
Chromium	Ingestion									1.E-06
	Age 9 - 16 years	4.5E+01	mg/kg	6.7E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.0E-06	
	Age 16 - 18 years	4.5E+01	mg/kg	1.9E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	9.6E-08	
	Dermal Absorption									1.E-05
	Age 9 - 16 years	4.5E+01	mg/kg	2.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	1.2E-05	
	Age 16 - 18 years	4.5E+01	mg/kg	5.9E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.2E-06	

Table 8.42
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	6.3E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	5.0E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	4.9E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Aroclor 1248	5.6E+00	mg/kg	1.6E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-07
	Aroclor 1254	1.3E+00	mg/kg	3.8E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.6E-08
	Aroclor 1260	1.6E+00	mg/kg	4.7E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.4E-08
	Antimony	3.9E+01	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	4.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.1E-07
	Chromium (Total)	5.1E+03	mg/kg	1.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.3E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	6.5E-07
	Cobalt	4.3E+03	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.5E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	2.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	1.0E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	9.92E+03	pCi/g	1.E-10
	Bismuth-214	6.2E-01	pCi/g	--	--	3.32E+00	pCi/g	2.E-07
	Lead-212	9.8E-01	pCi/g	--	--	2.57E+02	pCi/g	4.E-09
	Lead-214	7.3E-01	pCi/g	--	--	3.32E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	2.85E+02	pCi/g	5.E-08
	Radium-226	9.9E-01	pCi/g	--	--	2.93E+00	pCi/g	3.E-07
	Radium-228	9.8E-01	pCi/g	--	--	6.13E+00	pCi/g	2.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								3.E-06
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.5E-07	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.2E-07	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.8E-07	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-07
	Aroclor 1248	5.6E+00	mg/kg	4.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-07
	Aroclor 1254	1.3E+00	mg/kg	9.6E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Aroclor 1260	1.6E+00	mg/kg	1.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Antimony	3.9E+01	mg/kg	2.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	3.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Chromium (Total)	5.1E+03	mg/kg	2.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	2.4E-07	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	4.7E-06
	Cobalt	4.3E+03	mg/kg	2.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	3.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	2.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	2.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	3.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	4.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	5.5E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	5.57E-01	pCi/g	2.E-06
	Bismuth-214	6.2E-01	pCi/g	--	--	5.27E-01	pCi/g	1.E-06
	Lead-212	9.8E-01	pCi/g	--	--	5.23E-01	pCi/g	2.E-06
	Lead-214	7.3E-01	pCi/g	--	--	4.65E-01	pCi/g	2.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	4.87E+00	pCi/g	3.E-06
	Radium-226	9.9E-01	pCi/g	--	--	4.64E-01	pCi/g	2.E-06
	Radium-228	9.8E-01	pCi/g	--	--	3.37E-01	pCi/g	3.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	2.15E-01	pCi/g	2.E-06
Dermal Absorption Route Total								2.E-05
							Total of Receptor Risks Across All Media	3.E-05

Table 8.43
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Utility Trench within Estuarine Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.7E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-10
	Benzo(a)pyrene	1.7E+00	mg/kg	1.4E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.4E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-10
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	3.2E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Aroclor 1248	5.6E+00	mg/kg	4.5E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-09
	Aroclor 1254	1.3E+00	mg/kg	1.0E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Aroclor 1260	1.6E+00	mg/kg	1.3E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Antimony	3.9E+01	mg/kg	3.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.1E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Chromium (Total)	5.1E+03	mg/kg	4.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	3.6E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Cobalt	4.3E+03	mg/kg	3.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	5.0E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	4.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	4.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	5.3E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	7.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.8E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Bismuth-212	1.2E+00	pCi/g	--	--	1.37E+06	pCi/g	9.E-13
	Bismuth-214	6.2E-01	pCi/g	--	--	2.97E+02	pCi/g	2.E-09
	Lead-212	9.8E-01	pCi/g	--	--	4.46E+04	pCi/g	2.E-11
	Lead-214	7.3E-01	pCi/g	--	--	2.97E+02	pCi/g	2.E-09
	Potassium-40	1.5E+01	pCi/g	--	--	4.02E+04	pCi/g	4.E-10
	Radium-226	9.9E-01	pCi/g	--	--	2.60E+02	pCi/g	4.E-09
	Radium-228	9.8E-01	pCi/g	--	--	7.28E+02	pCi/g	1.E-09
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								7.E-08
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	7.3E-10	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	7.E-11
	Benzo(a)pyrene	1.7E+00	mg/kg	5.7E-10	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-10
	Benzo(b)fluoranthene	1.7E+00	mg/kg	5.6E-10	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	6.E-11
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.3E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Aroclor 1248	5.6E+00	mg/kg	2.0E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Aroclor 1254	1.3E+00	mg/kg	4.7E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-10
	Aroclor 1260	1.6E+00	mg/kg	5.8E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Antimony	3.9E+01	mg/kg	1.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.8E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Chromium (Total)	5.1E+03	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.2E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Cobalt	4.3E+03	mg/kg	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.7E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	2.4E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.7E-15	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-10
	Bismuth-212	1.2E+00	pCi/g	--	--	3.34E+01	pCi/g	4.E-08
	Bismuth-214	6.2E-01	pCi/g	--	--	3.16E+01	pCi/g	2.E-08
	Lead-212	9.8E-01	pCi/g	--	--	3.14E+01	pCi/g	3.E-08
	Lead-214	7.3E-01	pCi/g	--	--	2.79E+01	pCi/g	3.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	2.92E+02	pCi/g	5.E-08
	Radium-226	9.9E-01	pCi/g	--	--	2.78E+01	pCi/g	4.E-08
	Radium-228	9.8E-01	pCi/g	--	--	2.02E+01	pCi/g	5.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	1.29E+01	pCi/g	3.E-08
Dermal Absorption Route Total								3.E-07
Inhalation								
	Aroclor 1248	2.3E-05	mg/m^3	1.5E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-10
	Aroclor 1254	4.0E-06	mg/m^3	2.6E-10	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-10
	Aroclor 1260	3.2E-06	mg/m^3	2.1E-10	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-10
	Chromium (Total)	4.6E-05	mg/m^3	3.0E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	4.0E-07	mg/m^3	2.6E-11	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	2.E-09
	Cobalt	3.9E-05	mg/m^3	2.5E-09	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	2.E-08
	Nickel	4.8E-05	mg/m^3	3.1E-09	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	8.E-10
	Mercury	4.6E-03	mg/m^3	3.0E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
Inhalation Route Total								3.E-08
							Total of Receptor Risks Across All Media	4.E-07

Table 8.44
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Dock Construction Project within Estuarine Wetland
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Benzo(a)pyrene	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Benzo(b)fluoranthene	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Aroclor 1248	5.6E+00	mg/kg	4.1E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-08
	Aroclor 1254	1.3E+00	mg/kg	9.4E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Aroclor 1260	1.6E+00	mg/kg	1.2E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Antimony	3.9E+01	mg/kg	2.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Chromium (Total)	5.1E+03	mg/kg	3.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	3.2E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Cobalt	4.3E+03	mg/kg	3.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	4.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	3.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	3.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	4.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	6.7E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.5E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Bismuth-212	1.2E+00	pCi/g	--	--	1.52E+05	pCi/g	8.E-12
	Bismuth-214	6.2E-01	pCi/g	--	--	3.30E+01	pCi/g	2.E-08
	Lead-212	9.8E-01	pCi/g	--	--	4.96E+03	pCi/g	2.E-10
	Lead-214	7.3E-01	pCi/g	--	--	3.30E+01	pCi/g	2.E-08
	Potassium-40	1.5E+01	pCi/g	--	--	4.47E+03	pCi/g	3.E-09
	Radium-226	9.9E-01	pCi/g	--	--	2.89E+01	pCi/g	3.E-08
	Radium-228	9.8E-01	pCi/g	--	--	8.09E+01	pCi/g	1.E-08
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								6.E-07
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	6.5E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	7.E-10
	Benzo(a)pyrene	1.7E+00	mg/kg	5.1E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-09
	Benzo(b)fluoranthene	1.7E+00	mg/kg	5.1E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	5.E-10
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Aroclor 1248	5.6E+00	mg/kg	1.8E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-08
	Aroclor 1254	1.3E+00	mg/kg	4.2E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-09
	Aroclor 1260	1.6E+00	mg/kg	5.2E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Antimony	3.9E+01	mg/kg	9.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.6E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Chromium (Total)	5.1E+03	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	1.0E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Cobalt	4.3E+03	mg/kg	1.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	1.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.5E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	2.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.4E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Bismuth-212	1.2E+00	pCi/g	--	--	3.71E+00	pCi/g	3.E-07
	Bismuth-214	6.2E-01	pCi/g	--	--	3.51E+00	pCi/g	2.E-07
	Lead-212	9.8E-01	pCi/g	--	--	3.49E+00	pCi/g	3.E-07
	Lead-214	7.3E-01	pCi/g	--	--	3.10E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.25E+01	pCi/g	5.E-07
	Radium-226	9.9E-01	pCi/g	--	--	3.09E+00	pCi/g	3.E-07
	Radium-228	9.8E-01	pCi/g	--	--	2.25E+00	pCi/g	4.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	1.44E+00	pCi/g	2.E-07
Dermal Absorption Route Total								3.E-06
Inhalation								
	Aroclor 1248	2.3E-05	mg/m^3	1.4E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	8.E-09
	Aroclor 1254	4.0E-06	mg/m^3	2.4E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-09
	Aroclor 1260	3.2E-06	mg/m^3	1.9E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-09
	Chromium (Total)	4.6E-05	mg/m^3	2.7E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	4.0E-07	mg/m^3	2.3E-10	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	2.E-08
	Cobalt	3.9E-05	mg/m^3	2.3E-08	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	2.E-07
	Nickel	4.8E-05	mg/m^3	2.8E-08	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	7.E-09
	Mercury	4.6E-03	mg/m^3	2.7E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
Inhalation Route Total								2.E-07
							Total of Receptor Risks Across All Media	4.E-06

Table 8.45
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.45a for Mutagenic Risks				1.E-07
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.45a for Mutagenic Risks				1.E-06
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.45a for Mutagenic Risks				9.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.45a for Mutagenic Risks				2.E-06
	Aroclor 1248	5.6E+00	mg/kg	6.9E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Aroclor 1254	1.3E+00	mg/kg	1.6E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Aroclor 1260	1.6E+00	mg/kg	2.0E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Antimony	3.9E+01	mg/kg	4.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.7E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Chromium (Total)	5.1E+03	mg/kg	6.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.45a for Mutagenic Risks				1.E-05
	Cobalt	4.3E+03	mg/kg	5.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	7.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	6.1E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	6.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	8.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	4.3E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	6.20E+03	pCi/g	2.E-10
	Bismuth-214	6.2E-01	pCi/g	--	--	2.08E+00	pCi/g	3.E-07
	Lead-212	9.8E-01	pCi/g	--	--	1.60E+02	pCi/g	6.E-09
	Lead-214	7.3E-01	pCi/g	--	--	2.08E+00	pCi/g	3.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	1.78E+02	pCi/g	9.E-08
	Radium-226	9.9E-01	pCi/g	--	--	1.83E+00	pCi/g	5.E-07
	Radium-228	9.8E-01	pCi/g	--	--	3.83E+00	pCi/g	3.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								2.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.45a for Mutagenic Risks				8.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.45a for Mutagenic Risks				6.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.45a for Mutagenic Risks				6.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.45a for Mutagenic Risks				1.E-06
	Aroclor 1248	5.6E+00	mg/kg	6.8E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Aroclor 1254	1.3E+00	mg/kg	1.6E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Aroclor 1260	1.6E+00	mg/kg	1.9E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
	Antimony	3.9E+01	mg/kg	3.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	6.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	9.E-07
	Chromium (Total)	5.1E+03	mg/kg	4.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.45a for Mutagenic Risks				3.E-05
	Cobalt	4.3E+03	mg/kg	3.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	5.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	4.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	4.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	5.7E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	7.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	9.0E-13	mg/kg-day	1.30E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	4.28E-01	pCi/g	3.E-06
	Bismuth-214	6.2E-01	pCi/g	--	--	4.05E-01	pCi/g	2.E-06
	Lead-212	9.8E-01	pCi/g	--	--	4.03E-01	pCi/g	2.E-06
	Lead-214	7.3E-01	pCi/g	--	--	3.58E-01	pCi/g	2.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	3.75E+00	pCi/g	4.E-06
	Radium-226	9.9E-01	pCi/g	--	--	3.57E-01	pCi/g	3.E-06
	Radium-228	9.8E-01	pCi/g	--	--	2.59E-01	pCi/g	4.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	1.66E-01	pCi/g	2.E-06
Dermal Absorption Route Total								5.E-05
							Total of Receptor Risks Across All Media	7.E-05

Table 8.45a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									1.E-07
	Age 0 -2 years	2.2E+00	mg/kg	6.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	6.8E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	1.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.1E-08	
	Age 6 - 16 years	2.2E+00	mg/kg	3.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	9.5E-09	
	Age 16 - 30 years	2.2E+00	mg/kg	3.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	3.2E-09	
	Dermal Absorption									8.E-08
	Age 0 -2 years	2.2E+00	mg/kg	3.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.1E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	6.3E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.9E-08	
	Age 6 - 16 years	2.2E+00	mg/kg	7.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.2E-08	
	Age 16 - 30 years	2.2E+00	mg/kg	7.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	7.4E-09	
Benzo(a)pyrene	Ingestion									1.E-06
	Age 0 -2 years	1.7E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.3E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.2E-07	
	Age 6 - 16 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.5E-08	
	Age 16 - 26 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.5E-08	
	Dermal Absorption									6.E-07
	Age 0 -2 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.5E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	4.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.5E-07	
	Age 6 - 16 years	1.7E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.8E-07	
	Age 16 - 26 years	1.7E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.9E-08	
Benzo(b)fluoranthene	Ingestion									9.E-08
	Age 0 -2 years	1.7E+00	mg/kg	5.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	5.2E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	1.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.1E-08	
	Age 6 - 16 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.4E-09	
	Age 16 - 30 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.5E-09	
	Dermal Absorption									6.E-08
	Age 0 -2 years	1.7E+00	mg/kg	2.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.4E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	4.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.5E-08	
	Age 6 - 16 years	1.7E+00	mg/kg	5.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.7E-08	
	Age 16 - 30 years	1.7E+00	mg/kg	5.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	5.8E-09	

Table 8.45a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Dibenzo(a.h)anthracene	Ingestion									2.E-06
	Age 0 -2 years	4.0E+00	mg/kg	1.3E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.3E-06	
	Age 2 - 6 years	4.0E+00	mg/kg	2.5E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.5E-07	
	Age 6 - 16 years	4.0E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.8E-07	
	Age 16 - 30 years	4.0E+00	mg/kg	5.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.9E-08	
	Dermal Absorption									1.E-06
	Age 0 -2 years	4.0E+00	mg/kg	5.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.8E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	1.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.5E-07	
	Age 6 - 16 years	4.0E+00	mg/kg	1.4E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	4.1E-07	
	Age 16 - 30 years	4.0E+00	mg/kg	1.4E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.4E-07	
Chromium	Ingestion									1.E-05
	Age 0 -2 years	4.5E+01	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.0E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	2.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.2E-06	
	Age 6 - 16 years	4.5E+01	mg/kg	6.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	9.8E-07	
	Age 16 - 26 years	4.5E+01	mg/kg	6.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	3.3E-07	
	Dermal Absorption									3.E-05
	Age 0 -2 years	4.5E+01	mg/kg	5.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	9.9E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	9.9E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	6.0E-06	
	Age 6 - 16 years	4.5E+01	mg/kg	1.2E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	7.1E-06	
	Age 16 - 26 years	4.5E+01	mg/kg	1.2E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	2.4E-06	

Table 8.46
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment
Exposure Point: Estuarine Wetland Sediment
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.46a for Mutagenic Risks				6.E-08
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.46a for Mutagenic Risks				5.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.46a for Mutagenic Risks				5.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.46a for Mutagenic Risks				1.E-06
	Aroclor 1248	5.6E+00	mg/kg	3.5E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.E-07
	Aroclor 1254	1.3E+00	mg/kg	7.9E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Aroclor 1260	1.6E+00	mg/kg	9.9E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Antimony	3.9E+01	mg/kg	2.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	8.6E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	Chromium (Total)	5.1E+03	mg/kg	3.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.46a for Mutagenic Risks				6.E-06
	Cobalt	4.3E+03	mg/kg	2.7E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	3.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	3.1E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	3.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	4.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	5.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	mg/kg	2.1E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	1.24E+04	pCi/g	1.E-10
	Bismuth-214	6.2E-01	pCi/g	--	--	4.15E+00	pCi/g	1.E-07
	Lead-212	9.8E-01	pCi/g	--	--	3.21E+02	pCi/g	3.E-09
	Lead-214	7.3E-01	pCi/g	--	--	4.15E+00	pCi/g	2.E-07
	Potassium-40	1.5E+01	pCi/g	--	--	3.56E+02	pCi/g	4.E-08
	Radium-226	9.9E-01	pCi/g	--	--	3.66E+00	pCi/g	3.E-07
	Radium-228	9.8E-01	pCi/g	--	--	7.67E+00	pCi/g	1.E-07
	Thallium-208	3.2E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								1.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	2.2E+00	mg/kg	See Table 8.46a for Mutagenic Risks				1.E-07
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.46a for Mutagenic Risks				9.E-07
	Benzo(b)fluoranthene	1.7E+00	mg/kg	See Table 8.46a for Mutagenic Risks				9.E-08
	Dibenzo(a,h)anthracene	4.0E+00	mg/kg	See Table 8.46a for Mutagenic Risks				2.E-06
	Aroclor 1248	5.6E+00	mg/kg	1.3E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aroclor 1254	1.3E+00	mg/kg	3.1E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-07
	Aroclor 1260	1.6E+00	mg/kg	3.9E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-07
	Antimony	3.9E+01	mg/kg	6.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	2.3E+01	mg/kg	1.2E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Chromium (Total)	5.1E+03	mg/kg	8.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.5E+01	mg/kg	See Table 8.46a for Mutagenic Risks				4.E-05
	Cobalt	4.3E+03	mg/kg	7.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.2E+02	mg/kg	1.1E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	5.0E+04	mg/kg	8.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.4E+03	mg/kg	9.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	6.6E+00	mg/kg	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	9.2E+00	mg/kg	1.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	2,3,7,8-TCDD TEQ	3.5E-05	pCi/g	1.8E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Bismuth-212	1.2E+00	pCi/g	--	--	8.57E-01	pCi/g	1.E-06
	Bismuth-214	6.2E-01	pCi/g	--	--	8.11E-01	pCi/g	8.E-07
	Lead-212	9.8E-01	pCi/g	--	--	8.05E-01	pCi/g	1.E-06
	Lead-214	7.3E-01	pCi/g	--	--	7.16E-01	pCi/g	1.E-06
	Potassium-40	1.5E+01	pCi/g	--	--	7.50E+00	pCi/g	2.E-06
	Radium-226	9.9E-01	pCi/g	--	--	7.14E-01	pCi/g	1.E-06
	Radium-228	9.8E-01	pCi/g	--	--	5.19E-01	pCi/g	2.E-06
	Thallium-208	3.2E-01	pCi/g	--	--	3.31E-01	pCi/g	1.E-06
Dermal Absorption Route Total								6.E-05
							Total of Receptor Risks Across All Media	7.E-05

Table 8.46a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									6.E-08
	Age 0 -2 years	2.2E+00	mg/kg	3.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.4E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	6.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.0E-08	
	Age 6 - 16 years	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.7E-09	
	Age 16 - 30 years	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.6E-09	
	Dermal Absorption									1.E-07
	Age 0 -2 years	2.2E+00	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.6E-08	
	Age 2 - 6 years	2.2E+00	mg/kg	3.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	9.4E-09	
	Age 6 - 16 years	2.2E+00	mg/kg	2.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.5E-08	
	Age 16 - 30 years	2.2E+00	mg/kg	2.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.2E-08	
Benzo(a)pyrene	Ingestion									5.E-07
	Age 0 -2 years	1.7E+00	mg/kg	2.7E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.7E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.6E-07	
	Age 6 - 16 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.7E-08	
	Age 16 - 26 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.2E-08	
	Dermal Absorption									9.E-07
	Age 0 -2 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.2E-07	
	Age 2 - 6 years	1.7E+00	mg/kg	2.5E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	7.4E-08	
	Age 6 - 16 years	1.7E+00	mg/kg	1.7E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.1E-07	
	Age 16 - 26 years	1.7E+00	mg/kg	1.7E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.7E-07	
Benzo(b)fluoranthene	Ingestion									5.E-08
	Age 0 -2 years	1.7E+00	mg/kg	2.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.6E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	5.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.6E-08	
	Age 6 - 16 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.7E-09	
	Age 16 - 30 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.2E-09	
	Dermal Absorption									9.E-08
	Age 0 -2 years	1.7E+00	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.2E-08	
	Age 2 - 6 years	1.7E+00	mg/kg	2.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.3E-09	
	Age 6 - 16 years	1.7E+00	mg/kg	1.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.1E-08	
	Age 16 - 30 years	1.7E+00	mg/kg	1.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.7E-08	

Table 8.46a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Dibenzo(a.h)anthracene	Ingestion									1.E-06
	Age 0 -2 years	4.0E+00	mg/kg	6.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	6.3E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	1.3E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.8E-07	
	Age 6 - 16 years	4.0E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	8.8E-08	
	Age 16 - 30 years	4.0E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.9E-08	
	Dermal Absorption									2.E-06
	Age 0 -2 years	4.0E+00	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.9E-07	
	Age 2 - 6 years	4.0E+00	mg/kg	5.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.7E-07	
	Age 6 - 16 years	4.0E+00	mg/kg	4.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.2E-06	
	Age 16 - 30 years	4.0E+00	mg/kg	4.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	4.0E-07	
Chromium	Ingestion									6.E-06
	Age 0 -2 years	4.5E+01	mg/kg	7.0E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	3.5E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.1E-06	
	Age 6 - 16 years	4.5E+01	mg/kg	3.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.9E-07	
	Age 16 - 26 years	4.5E+01	mg/kg	3.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	1.6E-07	
	Dermal Absorption									4.E-05
	Age 0 -2 years	4.5E+01	mg/kg	2.5E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	5.0E-06	
	Age 2 - 6 years	4.5E+01	mg/kg	5.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.0E-06	
	Age 6 - 16 years	4.5E+01	mg/kg	3.4E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.1E-05	
	Age 16 - 26 years	4.5E+01	mg/kg	3.4E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	6.9E-06	

Table 8.47

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	1.8E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.47a for Mutagenic Risks				1.E-06
				Iron	1.1E+01	mg/L	3.5E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	6.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	5.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-08
				Radium-226	2.5E+01	pCi/L	--	--	2.6E+01	pCi/L	1.E-06
			Exp. Route Total								2.E-06
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	8.7E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.47a for Mutagenic Risks				4.E-06
				Iron	1.1E+01	mg/L	1.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	3.2E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	5.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-06
				Radium-226	2.5E+01	pCi/L	--	--	2.1E+06	pCi/L	1.E-11
			Exp. Route Total								1.E-05
	Exposure Medium Total										1.E-05

Table 8.47a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									1.E-06
	Age 0 - 2 years	1.4E-02	mg/L	1.4E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.E-07	
	Age 2 - 6 years	1.4E-02	mg/L	2.8E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-07	
	Dermal Absorption									4.E-06
	Age 0 - 2 years	1.4E-02	mg/L	1.3E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-06	
	Age 2 - 6 years	1.4E-02	mg/L	2.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-06	

Table 8.48

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	7.6E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.48a for Mutagenic Risks				2.E-07
				Iron	1.1E+01	mg/L	1.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	2.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	2.2E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
				Radium-226	2.5E+01	pCi/L	--	--	1.7E+01	pCi/L	1.E-06
			Exp. Route Total								2.E-06
Surface Water	Surface Water	Northern Drainage Channel Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	1.5E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.48a for Mutagenic Risks				4.E-06
				Iron	1.1E+01	mg/L	3.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	5.7E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	9.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
				Radium-226	2.5E+01	pCi/L	--	--	1.4E+06	pCi/L	2.E-11
			Exp. Route Total								2.E-05
	Exposure Medium Total										2.E-05

Table 8.48a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									2.E-07
	Age 9 - 16 years	1.4E-02	mg/L	1.34E-07	mg/kg-day	5.00E-01	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 18 years	1.4E-02	mg/L	3.84E-08	mg/kg-day	5.00E-01	(mg/kg-day)-1	1	2.E-08	
	Dermal Absorption									4.E-06
	Age 9 - 16 years	1.4E-02	mg/L	5.48E-08	mg/kg-day	2.00E+01	(mg/kg-day)-1	3	3.E-06	
	Age 16 - 18 years	1.4E-02	mg/L	1.57E-08	mg/kg-day	2.00E+01	(mg/kg-day)-1	1	3.E-07	

Table 8.49

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Tap	Ingestion	Arsenic	5.9E-03	mg/L	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Chromium (Hexavalent)	1.4E-02	mg/L	2.6E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Iron	1.1E+01	mg/L	2.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	4.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	3.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-08
				Radium-226	2.5E+01	pCi/L	--	--	7.8E+00	pCi/L	3.E-06
			Exp. Route Total								4.E-06
Groundwater	Water	Shower	Dermal contact	Arsenic	5.9E-03	mg/L	1.4E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	1.4E-02	mg/L	6.3E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.E-06
				Iron	1.1E+01	mg/L	2.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	5.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	8.3E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
				Radium-226	2.5E+01	pCi/L	--	--	6.2E+05	pCi/L	4.E-11
			Exp. Route Total								1.E-05
	Exposure Medium Total										2.E-05

Table 8.50

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface water	Water	Excavation	Ingestion	Arsenic	5.9E-03	mg/L	3.8E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-10
				Chromium (Hexavalent)	1.4E-02	mg/L	8.7E-10	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	4.E-10
				Iron	1.1E+01	mg/L	7.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	1.4E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.1E-15	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-10
				Radium-226	2.5E+01	pCi/L	--	--	3.3E+04	pCi/L	8.E-10
			Exp. Route Total								2.E-09
Surface water	Water	Excavation	Dermal contact	Arsenic	5.9E-03	mg/L	2.7E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-10
				Chromium (Hexavalent)	1.4E-02	mg/L	1.2E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Iron	1.1E+01	mg/L	5.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	1.0E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.1E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Radium-226	2.5E+01	pCi/L	--	--	2.5E+08	pCi/L	1.E-13
			Exp. Route Total								2.E-07
	Exposure Medium Total										2.E-07

Table 8.51

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Northern Drainage Channel
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Groundwater	Water	Tap	Ingestion	Arsenic	5.9E-03	mg/L	3.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.51a for Mutagenic Risks				1.E-06
				Iron	1.1E+01	mg/L	5.7E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	8.7E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Radium-226	2.5E+01	pCi/L	--	--	6.0E+00	pCi/L	4.E-06
			Exp. Route Total								6.E-06
Groundwater	Water	Shower	Dermal contact	Arsenic	5.9E-03	mg/L	2.2E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
				Chromium (Hexavalent)	1.4E-02	mg/L	See Table 8.51a for Mutagenic Risks				7.E-06
				Iron	1.1E+01	mg/L	4.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.2E-03	mg/L	8.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				2,3,7,8-TCDD TEQ	1.7E-08	mg/L	1.3E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-05
				Radium-226	2.5E+01	pCi/L	--	--	4.8E+05	pCi/L	5.E-11
			Exp. Route Total								2.E-05
	Exposure Medium Total										3.E-05

Table 8.51a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	1.4E-02	mg/L	1.4E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.E-07	1.E-06
	Age 2 - 6 years	1.4E-02	mg/L	2.8E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-07	
	Age 6 - 16 years	1.4E-02	mg/L	1.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 26 years	1.4E-02	mg/L	1.3E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	7.E-08	
	Dermal Absorption									
	Age 0 -2 years	1.4E-02	mg/L	1.3E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-06	7.E-06
	Age 2 - 6 years	1.4E-02	mg/L	2.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-06	
	Age 6 - 16 years	1.4E-02	mg/L	3.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 26 years	1.4E-02	mg/L	3.2E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	6.E-07	

Table 8.52

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	1.8E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.52a for Mutagenic Risks				2.E-07
				Iron	7.7E-01	mg/L	2.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.0E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	6.9E-11	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.5E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	3.2E+03	pCi/L	5.E-08
			Exp. Route Total								5.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	8.4E-09	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	1.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.52a for Mutagenic Risks				8.E-07
				Iron	7.7E-01	mg/L	1.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	4.9E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	3.7E-09	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	7.E-09
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.4E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	2.2E+07	pCi/L	7.E-12
			Exp. Route Total								1.E-06
	Exposure Medium Total										2.E-06

Table 8.52a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									2.E-07
	Age 0 - 2 years	2.6E-03	mg/kg	2.7E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	2.6E-03	mg/kg	5.3E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	8.E-08	
	Dermal Absorption									8.E-07
	Age 0 - 2 years	2.6E-03	mg/kg	2.5E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	5.E-07	
	Age 2 - 6 years	2.6E-03	mg/kg	5.1E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.E-07	

Table 8.53

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	7.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.53a for Mutagenic Risks				4.E-08
				Iron	7.7E-01	mg/L	9.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	4.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	2.9E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-11
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.0E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	2.1E+03	pCi/L	8.E-08
			Exp. Route Total								2.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.5E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.53a for Mutagenic Risks				7.E-07
				Iron	7.7E-01	mg/L	2.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	8.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	6.6E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.3E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	6.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	1.5E+07	pCi/L	1.E-11
			Exp. Route Total								1.E-06
	Exposure Medium Total										2.E-06

Table 8.53a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									4.E-08
	Age 9 - 16 years	2.6E-03	mg/L	2.58E-08	mg/kg-day	5.00E-01	(mg/kg-day)-1	3	4.E-08	
	Age 16 - 18 years	2.6E-03	mg/L	7.36E-09	mg/kg-day	5.00E-01	(mg/kg-day)-1	1	4.E-09	
	Dermal Absorption									7.E-07
	Age 9 - 16 years	2.6E-03	mg/L	1.05E-08	mg/kg-day	2.00E+01	(mg/kg-day)-1	3	6.E-07	
	Age 16 - 18 years	2.6E-03	mg/L	3.00E-09	mg/kg-day	2.00E+01	(mg/kg-day)-1	1	6.E-08	

Table 8.54

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	5.0E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	3.E-08
				Iron	7.7E-01	mg/L	1.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	6.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	4.3E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-11
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.6E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	9.7E+02	pCi/L	2.E-07
			Exp. Route Total								4.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	1.2E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Iron	7.7E-01	mg/L	1.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	7.9E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	5.9E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	3.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	6.7E+06	pCi/L	2.E-11
			Exp. Route Total								8.E-07
	Exposure Medium Total										1.E-06

Table 8.55

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	2.7E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	4.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.55a for Mutagenic Risks				3.E-07
				Iron	7.7E-01	mg/L	3.6E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.6E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	1.1E-10	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	3.8E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	2.3E+03	pCi/L	7.E-08
			Exp. Route Total								8.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	1.3E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.55a for Mutagenic Risks				1.E-06
				Iron	7.7E-01	mg/L	1.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	7.5E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	5.7E-09	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	3.7E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	1.6E+07	pCi/L	1.E-11
			Exp. Route Total								2.E-06
	Exposure Medium Total										3.E-06

Table 8.55a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									3.E-07
	Age 0 - 2 years	2.6E-03	mg/kg	4.1E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	2.6E-03	mg/kg	8.1E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-07	
	Dermal Absorption									1.E-06
	Age 0 - 2 years	2.6E-03	mg/kg	3.8E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	8.E-07	
	Age 2 - 6 years	2.6E-03	mg/kg	7.7E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	5.E-07	

Table 8.56

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.56a for Mutagenic Risks				6.E-08
				Iron	7.7E-01	mg/L	1.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	6.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	4.3E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-11
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.6E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	1.5E+03	pCi/L	1.E-07
			Exp. Route Total								3.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	2.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.56a for Mutagenic Risks				1.E-06
				Iron	7.7E-01	mg/L	3.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	1.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	6.6E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	1.0E+07	pCi/L	2.E-11
			Exp. Route Total								2.E-06
	Exposure Medium Total										2.E-06

Table 8.56a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									6.E-08
	Age 9 - 16 years	2.6E-03	mg/L	3.90E-08	mg/kg-day	5.00E-01	(mg/kg-day)-1	3	6.E-08	
	Age 16 - 18 years	2.6E-03	mg/L	1.12E-08	mg/kg-day	5.00E-01	(mg/kg-day)-1	1	6.E-09	
	Dermal Absorption									1.E-06
	Age 9 - 16 years	2.6E-03	mg/L	1.59E-08	mg/kg-day	2.00E+01	(mg/kg-day)-1	3	1.E-06	
	Age 16 - 18 years	2.6E-03	mg/L	4.55E-09	mg/kg-day	2.00E+01	(mg/kg-day)-1	1	9.E-08	

Table 8.57

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	1.7E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	7.6E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	4.E-08
				Iron	7.7E-01	mg/L	2.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	9.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	6.6E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	2.4E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	6.8E+02	pCi/L	2.E-07
			Exp. Route Total								5.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	2.0E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	1.8E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	4.E-07
				Iron	7.7E-01	mg/L	2.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	9.0E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	5.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-07
				Potassium-40	1.7E+02	pCi/L	--	--	4.7E+06	pCi/L	4.E-11
			Exp. Route Total								1.E-06
	Exposure Medium Total										2.E-06

Table 8.58

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	3.7E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-10
				Chromium (Hexavalent)	2.6E-03	mg/L	1.7E-10	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	8.E-11
				Iron	7.7E-01	mg/L	4.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	2.2E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	1.4E-13	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-13
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	5.3E-17	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-12
				Potassium-40	1.7E+02	pCi/L	--	--	4.1E+06	pCi/L	4.E-11
			Exp. Route Total								7.E-10
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	2.6E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-10
				Chromium (Hexavalent)	2.6E-03	mg/L	2.4E-10	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	5.E-09
				Iron	7.7E-01	mg/L	3.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.5E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	8.2E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	5.4E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	2.7E+09	pCi/L	6.E-14
			Exp. Route Total								1.E-08
	Exposure Medium Total										1.E-08

Table 8.59

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	4.4E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.59a for Mutagenic Risks				4.E-07
				Iron	7.7E-01	mg/L	5.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	2.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	1.7E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	6.2E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	5.2E+02	pCi/L	3.E-07
			Exp. Route Total								1.E-06
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	5.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 8.59a for Mutagenic Risks				2.E-06
				Iron	7.7E-01	mg/L	7.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	3.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	2.4E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.5E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
				Potassium-40	1.7E+02	pCi/L	--	--	3.6E+06	pCi/L	5.E-11
			Exp. Route Total								4.E-06
	Exposure Medium Total										5.E-06

Table 8.59a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	2.6E-03	mg/L	4.1E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.E-07	4.E-07
	Age 2 - 6 years	2.6E-03	mg/L	8.1E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 6 - 16 years	2.6E-03	mg/L	3.8E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.E-08	
	Age 16 - 26 years	2.6E-03	mg/L	3.8E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.E-08	
	Dermal Absorption									
	Age 0 -2 years	2.6E-03	mg/L	3.8E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	8.E-07	2.E-06
	Age 2 - 6 years	2.6E-03	mg/L	7.7E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	5.E-07	
	Age 6 - 16 years	2.6E-03	mg/L	9.2E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	5.E-07	
	Age 16 - 26 years	2.6E-03	mg/L	9.2E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	2.E-07	

Table 8.60

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Paradise Creek, Fresh Surface Water
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Paradise Creek	Ingestion	Arsenic	5.7E-03	mg/L	2.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 60a for Mutagenic Risks				3.E-07
				Iron	7.7E-01	mg/L	3.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	1.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	1.1E-10	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-10
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	4.1E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-09
				Potassium-40	1.7E+02	pCi/L	--	--	7.4E+02	pCi/L	2.E-07
			Exp. Route Total								9.E-07
Surface Water	Surface Water	Paradise Creek	Dermal contact	Arsenic	5.7E-03	mg/L	4.9E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.E-08
				Chromium (Hexavalent)	2.6E-03	mg/L	See Table 60a for Mutagenic Risks				1.E-06
				Iron	7.7E-01	mg/L	6.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	3.4E-03	mg/L	2.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				High Risk PCBs	2.2E-06	mg/L	2.2E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-08
				2,3,7,8-TCDD TEQ	8.1E-10	mg/L	1.4E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
				Potassium-40	1.7E+02	pCi/L	--	--	5.1E+06	pCi/L	3.E-11
			Exp. Route Total								3.E-06
	Exposure Medium Total										4.E-06

Table 8.60a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	2.6E-03	mg/L	2.7E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.E-07	3.E-07
	Age 2 - 6 years	2.6E-03	mg/L	5.3E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	8.E-08	
	Age 6 - 16 years	2.6E-03	mg/L	2.5E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-08	
	Age 16 - 26 years	2.6E-03	mg/L	2.5E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	1.E-08	
	Dermal Absorption									
	Age 0 -2 years	2.6E-03	mg/L	2.5E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	5.E-07	1.E-06
	Age 2 - 6 years	2.6E-03	mg/L	5.1E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.E-07	
	Age 6 - 16 years	2.6E-03	mg/L	6.0E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	4.E-07	
	Age 16 - 26 years	2.6E-03	mg/L	6.0E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.E-07	

Table 8.61

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)[1]		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	1.8E-07	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	3.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.61a for Mutagenic Risks				1.E-05
				Cobalt	2.6E-01	mg/L	8.1E-06	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Iron	9.3E-01	mg/L	2.9E-05	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Thallium	2.3E-03	mg/L	7.1E-08	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.1E-07	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	1.5E-13	mg/kg-day	1.3E+05	(mg/kg-day)$^{-1}$	2.E-08
				High Risk PCBs	2.4E-04	mg/L	7.3E-09	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	3.7E-14	mg/kg-day	1.3E+05	(mg/kg-day)$^{-1}$	5.E-09
				Radium-226	5.1E+01	pCi/L	--	--	2.6E+01	pCi/L	2.E-06
			Exp. Route Total								1.E-05
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	8.7E-09	mg/kg-day	1.5E+00	(mg/kg-day)$^{-1}$	1.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.61a for Mutagenic Risks				4.E-05
				Cobalt	2.6E-01	mg/L	1.5E-07	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Iron	9.3E-01	mg/L	1.4E-06	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Thallium	2.3E-03	mg/L	3.4E-09	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Cyanide	3.6E-03	mg/L	5.3E-09	mg/kg-day	NV	(mg/kg-day)$^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	3.8E-11	mg/kg-day	1.3E+05	(mg/kg-day)$^{-1}$	5.E-06
				High Risk PCBs	2.4E-04	mg/L	3.9E-07	mg/kg-day	2.0E+00	(mg/kg-day)$^{-1}$	8.E-07
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	3.6E-12	mg/kg-day	1.3E+05	(mg/kg-day)$^{-1}$	5.E-07
				Radium-226	5.1E+01	pCi/L	--	--	2.1E+06	pCi/L	2.E-11
			Exp. Route Total								5.E-05
	Exposure Medium Total										6.E-05

Table 8.61a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									1.E-05
	Age 0 - 2 years	1.4E-01	mg/kg	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.E-06	
	Age 2 - 6 years	1.4E-01	mg/kg	2.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-06	
	Dermal Absorption									4.E-05
	Age 0 - 2 years	1.4E-01	mg/kg	1.3E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-05	
	Age 2 - 6 years	1.4E-01	mg/kg	2.7E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	

Table 8.62

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	7.6E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	1.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.62 for Mutagenic Risks				2.E-06
				Cobalt	2.6E-01	mg/L	3.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	1.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	2.9E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	4.6E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	6.2E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	8.E-09
				High Risk PCBs	2.4E-04	mg/L	3.0E-09	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	6.E-09
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	1.5E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-09
				Radium-226	5.1E+01	pCi/L	--	--	1.7E+01	pCi/L	3.E-06
			Exp. Route Total								5.E-06
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal Contact	Arsenic	5.9E-03	mg/L	1.5E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.62 for Mutagenic Risks				4.E-05
				Cobalt	2.6E-01	mg/L	2.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	2.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	6.0E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	9.4E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	6.8E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	9.E-06
				High Risk PCBs	2.4E-04	mg/L	7.0E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	6.4E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	8.E-07
				Radium-226	5.1E+01	pCi/L	--	--	1.4E+06	pCi/L	4.E-11
			Exp. Route Total								5.E-05
	Exposure Medium Total										5.E-05

Table 8.62a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									2.E-06
	Age 9 - 16 years	1.4E-01	mg/L	1.35E-06	mg/kg-day	5.00E-01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 18 years	1.4E-01	mg/L	3.87E-07	mg/kg-day	5.00E-01	(mg/kg-day)-1	1	2.E-07	
	Dermal Absorption									4.E-05
	Age 9 - 16 years	1.4E-01	mg/L	5.52E-07	mg/kg-day	2.00E+01	(mg/kg-day)-1	3	3.E-05	
	Age 16 - 18 years	1.4E-01	mg/L	1.58E-07	mg/kg-day	2.00E+01	(mg/kg-day)-1	1	3.E-06	

Table 8.63

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	2.6E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-06
				Cobalt	2.6E-01	mg/L	5.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	1.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	4.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	7.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	9.4E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-08
				High Risk PCBs	2.4E-04	mg/L	4.6E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-09
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	2.3E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
				Radium-226	5.1E+01	pCi/L	--	--	7.8E+00	pCi/L	7.E-06
			Exp. Route Total								8.E-06
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	1.4E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	6.4E-07	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.E-05
				Cobalt	2.6E-01	mg/L	2.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	2.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	5.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	8.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	6.1E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-06
				High Risk PCBs	2.4E-04	mg/L	6.2E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	5.7E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-07
				Radium-226	5.1E+01	pCi/L	--	--	6.2E+05	pCi/L	8.E-11
			Exp. Route Total								2.E-05
	Exposure Medium Total										3.E-05

Table 8.64

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	2.8E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.64a for Mutagenic Risks				2.E-05
				Cobalt	2.6E-01	mg/L	1.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	4.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	2.3E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
				High Risk PCBs	2.4E-04	mg/L	1.1E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	5.6E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-09
				Radium-226	5.1E+01	pCi/L	--	--	1.8E+01	pCi/L	3.E-06
			Exp. Route Total								2.E-05
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	1.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.64a for Mutagenic Risks				6.E-05
				Cobalt	2.6E-01	mg/L	2.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	2.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	5.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	8.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	5.8E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-06
				High Risk PCBs	2.4E-04	mg/L	6.0E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	5.5E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.E-07
				Radium-226	5.1E+01	pCi/L	--	--	1.5E+06	pCi/L	4.E-11
			Exp. Route Total								7.E-05
	Exposure Medium Total										9.E-05

Table 8.64a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									2.E-05
	Age 0 - 2 years	1.4E-01	mg/kg	2.1E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.E-05	
	Age 2 - 6 years	1.4E-01	mg/kg	4.3E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.E-06	
	Dermal Absorption									6.E-05
	Age 0 - 2 years	1.4E-01	mg/kg	2.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	4.E-05	
	Age 2 - 6 years	1.4E-01	mg/kg	4.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	

Table 8.65

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	1.1E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.65a for Mutagenic Risks				3.E-06
				Cobalt	2.6E-01	mg/L	5.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	1.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	4.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	7.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	9.4E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-08
				High Risk PCBs	2.4E-04	mg/L	4.6E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-09
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	2.3E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-09
				Radium-226	5.1E+01	pCi/L	--	--	1.2E+01	pCi/L	4.E-06
			Exp. Route Total								8.E-06
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	2.3E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.65a for Mutagenic Risks				5.E-05
				Cobalt	2.6E-01	mg/L	4.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	3.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	9.1E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	1.0E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
				High Risk PCBs	2.4E-04	mg/L	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	9.7E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-06
				Radium-226	5.1E+01	pCi/L	--	--	9.7E+05	pCi/L	5.E-11
			Exp. Route Total								7.E-05
	Exposure Medium Total										8.E-05

Table 8.65a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									3.E-06
	Age 9 - 16 years	1.4E-01	mg/kg	2.05E-06	mg/kg-day	5.00E-01	(mg/kg-day)-1	3	3.E-06	
	Age 16 - 18 years	1.4E-01	mg/kg	5.86E-07	mg/kg-day	5.00E-01	(mg/kg-day)-1	1	3.E-07	
	Dermal Absorption									5.E-05
	Age 9 - 16 years	1.4E-01	mg/kg	8.37E-07	mg/kg-day	2.00E+01	(mg/kg-day)-1	3	5.E-05	
	Age 16 - 18 years	1.4E-01	mg/kg	2.39E-07	mg/kg-day	2.00E+01	(mg/kg-day)-1	1	5.E-06	

Table 8.66

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		Cancer Risk
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	1.7E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	4.0E-06	mg/kg-day	5.0E-01	$(mg/kg-day)^{-1}$	2.E-06
				Cobalt	2.6E-01	mg/L	7.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	2.7E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	6.8E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.1E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	1.4E-13	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-08
				High Risk PCBs	2.4E-04	mg/L	6.9E-09	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	3.5E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-09
				Radium-226	5.1E+01	pCi/L	--	--	5.5E+00	pCi/L	9.E-06
			Exp. Route Total								1.E-05
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	2.1E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	9.6E-07	mg/kg-day	2.0E+01	$(mg/kg-day)^{-1}$	2.E-05
				Cobalt	2.6E-01	mg/L	3.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	3.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	8.1E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.3E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	9.2E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-05
				High Risk PCBs	2.4E-04	mg/L	9.5E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	8.7E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-06
				Radium-226	5.1E+01	pCi/L	--	--	4.4E+05	pCi/L	1.E-10
			Exp. Route Total								3.E-05
	Exposure Medium Total										5.E-05

Table 8.67

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	3.8E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.E-10
				Chromium (Hexavalent)	1.4E-01	mg/L	8.8E-09	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	4.E-09
				Cobalt	2.6E-01	mg/L	1.7E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	6.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	1.5E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	2.3E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	3.1E-16	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.E-11
				High Risk PCBs	2.4E-04	mg/L	1.5E-11	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-11
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	7.8E-17	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-11
				Radium-226	5.1E+01	pCi/L	--	--	3.3E+04	pCi/L	2.E-09
			Exp. Route Total								7.E-09
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	2.7E-10	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-10
				Chromium (Hexavalent)	1.4E-01	mg/L	1.2E-08	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	2.E-07
				Cobalt	2.6E-01	mg/L	4.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	4.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	1.0E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.6E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	8.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
				High Risk PCBs	2.4E-04	mg/L	8.6E-09	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	7.9E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-08
				Radium-226	5.1E+01	pCi/L	--	--	2.5E+08	pCi/L	2.E-13
			Exp. Route Total								4.E-07
	Exposure Medium Total										4.E-07

Table 8.68

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	4.5E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	7.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.68a for Mutagenic Risks				1.E-05
				Cobalt	2.6E-01	mg/L	2.0E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	7.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	1.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	2.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	3.7E-13	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-08
				High Risk PCBs	2.4E-04	mg/L	1.8E-08	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	9.2E-14	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-08
				Radium-226	5.1E+01	pCi/L	--	--	4.2E+00	pCi/L	1.E-05
			Exp. Route Total								3.E-05
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	5.5E-08	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	8.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.68a for Mutagenic Risks				7.E-05
				Cobalt	2.6E-01	mg/L	9.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Iron	9.3E-01	mg/L	8.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	2.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	3.4E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	2.4E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-05
				High Risk PCBs	2.4E-04	mg/L	2.5E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	2.3E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	3.E-06
				Radium-226	5.1E+01	pCi/L	--	--	3.3E+05	pCi/L	2.E-10
			Exp. Route Total								1.E-04
	Exposure Medium Total										1.E-04

Table 8.68a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	1.4E-01	mg/L	2.1E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	1.E-05	2.E-05
	Age 2 - 6 years	1.4E-01	mg/L	4.3E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	6.E-06	
	Age 6 - 16 years	1.4E-01	mg/L	2.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	3.E-06	
	Age 16 - 26 years	1.4E-01	mg/L	2.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	1.E-06	
	Dermal Absorption									
	Age 0 -2 years	1.4E-01	mg/L	2.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	4.E-05	1.E-04
	Age 2 - 6 years	1.4E-01	mg/L	4.0E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	
	Age 6 - 16 years	1.4E-01	mg/L	4.8E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	3.E-05	
	Age 16 - 26 years	1.4E-01	mg/L	4.8E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	1.E-05	

Table 8.69

CALCULATION OF CHEMICAL CANCER RISKS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Estuarine Wetland
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk
					Value	Units	Intake		Cancer Slope Factor (Chemical COPCs) Screening value (radionuclides)		
							Value	Units	Value	Units	
Surface Water	Surface Water	Estuarine Wetland Surface Water	Ingestion	Arsenic	5.9E-03	mg/L	3.0E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.E-07
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.69a for Mutagenic Risks				1.E-05
				Cobalt	2.6E-01	mg/L	1.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	4.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	1.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	1.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	2.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-08
				High Risk PCBs	2.4E-04	mg/L	1.2E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	6.0E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-09
				Radium-226	5.1E+01	pCi/L	--	--	6.0E+00	pCi/L	9.E-06
			Exp. Route Total								2.E-05
Surface Water	Surface Water	Estuarine Wetland Surface Water	Dermal contact	Arsenic	5.9E-03	mg/L	5.0E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	8.E-08
				Chromium (Hexavalent)	1.4E-01	mg/L	See Table 8.69a for Mutagenic Risks				7.E-05
				Cobalt	2.6E-01	mg/L	8.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Iron	9.3E-01	mg/L	8.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Thallium	2.3E-03	mg/L	2.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Cyanide	3.6E-03	mg/L	3.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
				Dioxin-Like PCBs	4.8E-09	mg/L	2.2E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-05
				High Risk PCBs	2.4E-04	mg/L	2.3E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-06
				2,3,7,8-TCDD TEQ	1.2E-09	mg/L	2.1E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-06
				Radium-226	5.1E+01	pCi/L	--	--	4.8E+05	pCi/L	1.E-10
			Exp. Route Total								1.E-04
	Exposure Medium Total										1.E-04

Table 8.69a

CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-Adjusted

Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Chromium	Ingestion									
	Age 0 -2 years	1.4E-01	mg/L	1.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	7.E-06	1.E-05
	Age 2 - 6 years	1.4E-01	mg/L	2.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	4.E-06	
	Age 6 - 16 years	1.4E-01	mg/L	1.3E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 26 years	1.4E-01	mg/L	1.3E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	7.E-07	
	Dermal Absorption									
	Age 0 -2 years	1.4E-01	mg/L	1.3E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-05	7.E-05
	Age 2 - 6 years	1.4E-01	mg/L	2.7E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	
	Age 6 - 16 years	1.4E-01	mg/L	3.2E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	
	Age 16 - 26 years	1.4E-01	mg/L	3.2E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	6.E-06	

Table 8.70
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.3E-09	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	4.E-11
	Chlorobenzene	3.4E+01	mg/kg	9.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.7E-07	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Benzo(a)anthracene	9.4E-01	mg/kg	2.6E-07	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Benzo(a)pyrene	8.5E-01	mg/kg	2.3E-07	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-07
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.7E-07	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.4E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	6.3E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.4E-07	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Dieldrin	2.3E-03	mg/kg	6.3E-10	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.E-08
	4,4'-DDT	3.5E-03	mg/kg	9.7E-10	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.E-10
	Heptachlor epoxide	9.1E-03	mg/kg	2.5E-09	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.E-08
	Aroclor 1248	8.7E+01	mg/kg	2.4E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-05
	Aroclor 1254	5.8E+01	mg/kg	1.6E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-05
	Aroclor 1260	2.7E+01	mg/kg	7.5E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	High Risk PCB Congeners	7.3E+02	mg/kg	2.0E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-04
	Aluminum	3.2E+04	mg/kg	8.9E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	7.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	2.3E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Barium	3.4E+02	mg/kg	9.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	4.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	5.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	6.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.4E-06	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	7.E-07
	Cobalt	1.7E+02	mg/kg	4.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	1.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.0E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	2.0E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	1.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	2.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	1.4E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	2.7E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	3.E-05
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	8.0E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Bismuth-212	1.0E+00	pCi/g	--	--	4.00E+03	pCi/g	3.E-10
	Bismuth-214	1.7E+02	pCi/g	--	--	8.72E-01	pCi/g	2.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	5.59E+01	pCi/g	2.E-09
	Lead-210	2.2E+02	pCi/g	--	--	8.72E-01	pCi/g	3.E-04
	Lead-212	8.2E-01	pCi/g	--	--	1.31E+02	pCi/g	6.E-09
	Lead-214	1.9E+02	pCi/g	--	--	8.72E-01	pCi/g	2.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	1.18E+02	pCi/g	8.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	7.22E-01	pCi/g	4.E-06
	Radium-226	3.5E+01	pCi/g	--	--	7.62E-01	pCi/g	5.E-05
	Radium-228	8.5E-01	pCi/g	--	--	2.13E+00	pCi/g	4.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	7.19E-01	pCi/g	1.E-06
	Uranium-235	1.2E-01	pCi/g	--	--	3.23E+00	pCi/g	4.E-08
Ingestion Route Total								1.E-03

Table 8.70
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.7E-10	mg/kg-day	2.9E-02	$(mg/kg-day)^{-1}$	5.E-12
	Chlorobenzene	3.4E+01	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.1E-07	mg/kg-day	5.4E-03	$(mg/kg-day)^{-1}$	6.E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	1.4E-07	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	1.E-08
	Benzo(a)pyrene	8.5E-01	mg/kg	1.3E-07	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	1.E-07
	Benzo(b)fluoranthene	6.3E-01	mg/kg	9.5E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	1.E-08
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	5.7E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	8.E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	3.5E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	3.E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	7.8E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	8.E-09
	Dieldrin	2.3E-03	mg/kg	2.7E-10	mg/kg-day	1.6E+01	$(mg/kg-day)^{-1}$	4.E-09
	4,4'-DDT	3.5E-03	mg/kg	1.2E-10	mg/kg-day	3.4E-01	$(mg/kg-day)^{-1}$	4.E-11
	Heptachlor epoxide	9.1E-03	mg/kg	1.1E-09	mg/kg-day	9.1E+00	$(mg/kg-day)^{-1}$	1.E-08
	Aroclor 1248	8.7E+01	mg/kg	1.4E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-05
	Aroclor 1254	5.8E+01	mg/kg	9.5E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-05
	Aroclor 1260	2.7E+01	mg/kg	4.5E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	9.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	1.2E-04	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-04
	Aluminum	3.2E+04	mg/kg	3.8E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	3.2E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	4.8E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	7.E-07
	Barium	3.4E+02	mg/kg	3.9E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	2.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	2.3E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	2.5E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	5.8E-08	mg/kg-day	2.0E+01	$(mg/kg-day)^{-1}$	1.E-06
	Cobalt	1.7E+02	mg/kg	2.0E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	5.7E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	4.4E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	8.6E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	5.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	6.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	4.2E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	5.0E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	4.9E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	5.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	5.3E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	1.6E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-05
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.0E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	2.87E-02	pCi/g	4.E-05
	Bismuth-214	1.7E+02	pCi/g	--	--	2.72E-02	pCi/g	6.E-03
	Cesium-137	9.4E-02	pCi/g	--	--	7.70E-02	pCi/g	1.E-06
	Lead-210	2.2E+02	pCi/g	--	--	4.71E+01	pCi/g	5.E-06
	Lead-212	8.2E-01	pCi/g	--	--	2.69E-02	pCi/g	3.E-05
	Lead-214	1.9E+02	pCi/g	--	--	2.39E-02	pCi/g	8.E-03
	Potassium-40	9.1E+00	pCi/g	--	--	2.56E-01	pCi/g	4.E-05
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.35E-02	pCi/g	1.E-04
	Radium-226	3.5E+01	pCi/g	--	--	2.38E-02	pCi/g	1.E-03
	Radium-228	8.5E-01	pCi/g	--	--	1.74E-02	pCi/g	5.E-05
	Thallium-208	2.7E-01	pCi/g	--	--	1.11E-02	pCi/g	2.E-05
	Thorium-234	1.1E+00	pCi/g	--	--	2.35E-02	pCi/g	5.E-05
	Uranium-235	1.2E-01	pCi/g	--	--	8.62E-02	pCi/g	1.E-06
Dermal Absorption Route Total								2.E-02

Table 8.70
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	1.5E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	3.4E-04	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	5.9E-06	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	7.E-08
	Benzo(a)anthracene	2.0E-07	mg/m^3	1.5E-08	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	9.E-10
	Benzo(a)pyrene	6.2E-10	mg/m^3	4.6E-11	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	3.E-11
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	3.4E-11	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	2.E-12
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	2.7E-10	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	6.E-13
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	1.2E-11	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	7.E-12
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	2.8E-11	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	2.E-12
	Dieldrin	1.7E-12	mg/m^3	1.2E-13	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	6.E-13
	4,4'-DDT	2.6E-12	mg/m^3	1.9E-13	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	2.E-14
	Heptachlor epoxide	6.7E-12	mg/m^3	4.9E-13	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	1.E-12
	Aroclor 1248	1.3E-04	mg/m^3	9.5E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.E-06
	Aroclor 1254	6.4E-05	mg/m^3	4.7E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-06
	Aroclor 1260	1.9E-05	mg/m^3	1.4E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	8.E-07
	High Risk PCB Congeners	1.3E-03	mg/m^3	9.4E-05	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.E-05
	Aluminum	2.4E-05	mg/m^3	1.7E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	1.5E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	7.5E-10	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	3.E-09
	Barium	2.5E-07	mg/m^3	1.8E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	9.7E-11	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	2.E-10
	Cadmium	1.4E-08	mg/m^3	1.1E-09	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	2.E-09
	Chromium (Total)	1.6E-06	mg/m^3	1.2E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	2.7E-10	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	2.E-08
	Cobalt	1.2E-07	mg/m^3	9.2E-09	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	8.E-08
	Copper	3.6E-06	mg/m^3	2.6E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	2.0E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	4.0E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	2.5E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	3.1E-08	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	7.E-09
	Selenium	2.7E-09	mg/m^3	2.0E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	2.3E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	2.2E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	5.3E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	2.7E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	3.6E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	3.4E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.E-06
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	1.0E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	4.E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	1.07E+05	pCi/g	1.E-11
	Bismuth-214	1.7E+02	pCi/g	--	--	3.91E+02	pCi/g	4.E-07
	Cesium-137	9.4E-02	pCi/g	--	--	1.07E+05	pCi/g	9.E-13
	Lead-210	2.2E+02	pCi/g	--	--	3.92E+02	pCi/g	6.E-07
	Lead-212	8.2E-01	pCi/g	--	--	1.63E+04	pCi/g	5.E-11
	Lead-214	1.9E+02	pCi/g	--	--	3.90E+02	pCi/g	5.E-07
	Potassium-40	9.1E+00	pCi/g	--	--	5.44E+04	pCi/g	2.E-10
	Protactinium-234M	2.7E+00	pCi/g	--	--	9.98E+01	pCi/g	3.E-08
	Radium-226	3.5E+01	pCi/g	--	--	2.04E+02	pCi/g	2.E-07
	Radium-228	8.5E-01	pCi/g	--	--	6.42E+01	pCi/g	1.E-08
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	9.98E+01	pCi/g	1.E-08
	Uranium-235	1.2E-01	pCi/g	--	--	3.84E+01	pCi/g	3.E-09
Inhalation Route Total								7.E-05
							Total of Receptor Risks Across All Media	2.E-02

Table 8.71
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	9.1E-10	mg/kg-day	2.9E-02	$(mg/kg-day)^{-1}$	2.6E-11
	Chlorobenzene	3.4E+01	mg/kg	6.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.8E-07	mg/kg-day	5.4E-03	$(mg/kg-day)^{-1}$	9.9E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.71a for mutagenic calculations				9.4E-08
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.71a for mutagenic calculations				8.E-07
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.71a for mutagenic calculations				6.E-08
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	9.2E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	1.E-08
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.71a for mutagenic calculations				2.E-07
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.71a for mutagenic calculations				5.E-08
	Dieldrin	2.3E-03	mg/kg	4.3E-10	mg/kg-day	1.6E+01	$(mg/kg-day)^{-1}$	7.E-09
	4,4'-DDT	3.5E-03	mg/kg	6.6E-10	mg/kg-day	3.4E-01	$(mg/kg-day)^{-1}$	2.E-10
	Heptachlor epoxide	9.1E-03	mg/kg	1.7E-09	mg/kg-day	9.1E+00	$(mg/kg-day)^{-1}$	2.E-08
	Aroclor 1248	8.7E+01	mg/kg	1.6E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-05
	Aroclor 1254	5.8E+01	mg/kg	1.1E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-05
	Aroclor 1260	2.7E+01	mg/kg	5.1E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-05
	High Risk PCB Congeners	7.3E+02	mg/kg	1.4E-04	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-04
	Aluminum	3.2E+04	mg/kg	6.1E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	5.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.6E-06	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-06
	Barium	3.4E+02	mg/kg	6.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	3.4E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	3.7E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	4.1E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.71a for mutagenic calculations				2.E-06
	Cobalt	1.7E+02	mg/kg	3.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	9.2E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	7.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	1.4E-02	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	8.7E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	1.1E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	6.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	8.1E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	7.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	1.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	9.6E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	8.6E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	pCi/g	1.8E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.E-05
	2,3,7,8-TCDD TEQ	2.9E-04	pCi/g	5.4E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	7.E-06
	Bismuth-212	1.0E+00	pCi/g	.--	mg/kg-day	8.3E+03	pCi/g	1.E-10
	Bismuth-214	1.7E+02	pCi/g	.--	mg/kg-day	2.8E+00	pCi/g	6.E-05
	Cesium-137	9.4E-02	pCi/g	.--	mg/kg-day	3.3E+02	pCi/g	3.E-10
	Lead-210	2.2E+02	pCi/g	.--	mg/kg-day	2.8E+00	pCi/g	8.E-05
	Lead-212	8.2E-01	pCi/g	.--	mg/kg-day	2.1E+02	pCi/g	4.E-09
	Lead-214	1.9E+02	pCi/g	.--	mg/kg-day	2.8E+00	pCi/g	7.E-05
	Potassium-40	9.1E+00	pCi/g	.--	mg/kg-day	2.4E+02	pCi/g	4.E-08
	Protactinium-234M	2.7E+00	pCi/g	.--	mg/kg-day	2.3E+00	pCi/g	1.E-06
	Radium-226	3.5E+01	pCi/g	.--	mg/kg-day	2.4E+00	pCi/g	1.E-05
	Radium-228	8.5E-01	pCi/g	.--	mg/kg-day	5.1E+00	pCi/g	2.E-07
	Thallium-208	2.7E-01	pCi/g	.--	mg/kg-day	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	.--	mg/kg-day	2.3E+00	pCi/g	5.E-07
	Uranium-235	1.2E-01	pCi/g	--	mg/kg-day	9.5E+00	pCi/g	1.E-08
Ingestion Route Total								6.E-04

Table 8.71
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	6.5E-11	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	2.E-12
	Chlorobenzene	3.4E+01	mg/kg	4.5E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	4.3E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	2.E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.71a for mutagenic calculations				3.E-08
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.71a for mutagenic calculations				3.E-07
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.71a for mutagenic calculations				2.E-08
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.2E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.71a for mutagenic calculations				7.E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.71a for mutagenic calculations				2.E-08
	Dieldrin	2.3E-03	mg/kg	1.0E-10	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	2.E-09
	4,4'-DDT	3.5E-03	mg/kg	4.7E-11	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-11
	Heptachlor epoxide	9.1E-03	mg/kg	4.1E-10	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Aroclor 1248	8.7E+01	mg/kg	5.5E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Aroclor 1254	5.8E+01	mg/kg	3.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.E-06
	Aroclor 1260	2.7E+01	mg/kg	1.7E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	4.6E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-05
	Aluminum	3.2E+04	mg/kg	1.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	1.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.8E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-07
	Barium	3.4E+02	mg/kg	1.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	8.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	8.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	9.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.71a for mutagenic calculations				2.E-06
	Cobalt	1.7E+02	mg/kg	7.6E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	2.2E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.7E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	3.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	2.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	2.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	4.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	2.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	2.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	6.0E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-06
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	3.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	8.98E-01	pCi/g	1.E-06
	Bismuth-214	1.7E+02	pCi/g	--	--	8.49E-01	pCi/g	2.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	2.41E+00	pCi/g	4.E-08
	Lead-210	2.2E+02	pCi/g	--	--	1.47E+03	pCi/g	1.E-07
	Lead-212	8.2E-01	pCi/g	--	--	8.41E-01	pCi/g	1.E-06
	Lead-214	1.9E+02	pCi/g	--	--	7.47E-01	pCi/g	2.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	8.01E+00	pCi/g	1.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	7.36E-01	pCi/g	4.E-06
	Radium-226	3.5E+01	pCi/g	--	--	7.44E-01	pCi/g	5.E-05
	Radium-228	8.5E-01	pCi/g	--	--	5.44E-01	pCi/g	2.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	3.47E-01	pCi/g	8.E-07
	Thorium-234	1.1E+00	pCi/g	--	--	7.34E-01	pCi/g	1.E-06
	Uranium-235	1.2E-01	pCi/g	--	--	2.69E+00	pCi/g	4.E-08
Dermal Absorption Route Total								6.E-04

Table 8.71
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	4.9E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	1.1E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	1.9E-07	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	2.E-09
	Benzo(a)anthracene	2.0E-07	mg/m^3	See Table 8.71a for mutagenic calculations				1.E-10
	Benzo(a)pyrene	6.2E-10	mg/m^3	See Table 8.71a for mutagenic calculations				5.E-12
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	See Table 8.71a for mutagenic calculations				3.E-13
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	8.5E-12	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	2.E-14
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	See Table 8.71a for mutagenic calculations				1.E-12
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	See Table 8.71a for mutagenic calculations				3.E-13
	Dieldrin	1.7E-12	mg/m^3	3.9E-15	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	2.E-14
	4,4'-DDT	2.6E-12	mg/m^3	6.1E-15	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	6.E-16
	Heptachlor epoxide	6.7E-12	mg/m^3	1.6E-14	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	4.E-14
	Aroclor 1248	1.3E-04	mg/m^3	3.0E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.E-07
	Aroclor 1254	6.4E-05	mg/m^3	1.5E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-08
	Aroclor 1260	1.9E-05	mg/m^3	4.6E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-08
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.0E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.E-06
	Aluminum	2.4E-05	mg/m^3	5.6E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	4.7E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	2.4E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	1.E-10
	Barium	2.5E-07	mg/m^3	5.8E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	3.1E-12	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	7.E-12
	Cadmium	1.4E-08	mg/m^3	3.4E-11	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	6.E-11
	Chromium (Total)	1.6E-06	mg/m^3	3.8E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	See Table 8.71a for mutagenic calculations				4.E-09
	Cobalt	1.2E-07	mg/m^3	2.9E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	3.E-09
	Copper	3.6E-06	mg/m^3	8.5E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	6.5E-13	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	1.3E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	8.0E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	9.9E-10	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	2.E-10
	Selenium	2.7E-09	mg/m^3	6.3E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	7.5E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	7.2E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	1.7E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	8.8E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	1.1E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.1E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	4.E-08
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.2E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.E-08
	Bismuth-212	1.0E+00	pCi/g	--	--	2.0E+07	pCi/g	5.E-14
	Bismuth-214	1.7E+02	pCi/g	--	--	7.3E+04	pCi/g	2.E-09
	Cesium-137	9.4E-02	pCi/g	--	--	2.0E+07	pCi/g	5.E-15
	Lead-210	2.2E+02	pCi/g	--	--	7.4E+04	pCi/g	3.E-09
	Lead-212	8.2E-01	pCi/g	--	--	3.1E+06	pCi/g	3.E-13
	Lead-214	1.9E+02	pCi/g	--	--	7.3E+04	pCi/g	3.E-09
	Potassium-40	9.1E+00	pCi/g	--	--	1.0E+07	pCi/g	9.E-13
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.9E+04	pCi/g	1.E-10
	Radium-226	3.5E+01	pCi/g	--	--	3.8E+04	pCi/g	9.E-10
	Radium-228	8.5E-01	pCi/g	--	--	1.2E+04	pCi/g	7.E-11
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.9E+04	pCi/g	6.E-11
	Uranium-235	1.2E-01	pCi/g	--	--	7.2E+03	pCi/g	2.E-11
Inhalation Route Total								2.E-06
							Total of Receptor Risks Across All Media	1.E-03

Table 8.71a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									9.E-08
	Age 0 -2 years	9.4E-01	mg/kg	5.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	6.E-08	
	Age 2 - 6 years	9.4E-01	mg/kg	1.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-08	
	Dermal Absorption									3.E-08
	Age 0 -2 years	9.4E-01	mg/kg	1.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-08	
	Age 2 - 6 years	9.4E-01	mg/kg	3.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-08	
	Inhalation									1.E-10
	Age 0 -2 years	2.0E-07	mg/m3	1.6E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	9.E-11	
	Age 2 - 6 years	2.0E-07	mg/m3	3.1E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	6.E-11	
Benzo(a)pyrene	Ingestion									8.E-07
	Age 0 -2 years	8.5E-01	mg/kg	5.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	5.E-07	
	Age 2 - 6 years	8.5E-01	mg/kg	1.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.E-07	
	Dermal Absorption									3.E-07
	Age 0 -2 years	8.5E-01	mg/kg	1.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	8.5E-01	mg/kg	3.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-07	
	Inhalation									5.E-12
	Age 0 -2 years	6.2E-10	mg/m3	4.9E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	3.E-12	
	Age 2 - 6 years	6.2E-10	mg/m3	9.8E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	2.E-12	
Benzo(b)fluoranthene	Ingestion									6.E-08
	Age 0 -2 years	6.3E-01	mg/kg	3.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-08	
	Age 2 - 6 years	6.3E-01	mg/kg	7.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Dermal Absorption									2.E-08
	Age 0 -2 years	6.3E-01	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-08	
	Age 2 - 6 years	6.3E-01	mg/kg	2.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	7.E-09	
	Inhalation									3.E-13
	Age 0 -2 years	4.6E-10	mg/m3	3.6E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	2.E-13	
	Age 2 - 6 years	4.6E-10	mg/m3	7.2E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-13	

Table 8.71a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Trespasser/Visitor
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Dibenzo(a.h)anthracene	Ingestion									2.E-07
	Age 0 -2 years	2.3E-01	mg/kg	1.4E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	2.3E-01	mg/kg	2.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	9.E-08	
	Dermal Absorption									7.E-08
	Age 0 -2 years	2.3E-01	mg/kg	4.4E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	4.E-08	
	Age 2 - 6 years	2.3E-01	mg/kg	8.8E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.E-08	
	Inhalation									1.E-12
	Age 0 -2 years	1.7E-10	mg/m3	1.3E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	8.E-13	
	Age 2 - 6 years	1.7E-10	mg/m3	2.6E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	5.E-13	
Indeno(1,2,3-c,d)pyrene	Ingestion									5.E-08
	Age 0 -2 years	5.2E-01	mg/kg	3.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.E-08	
	Age 2 - 6 years	5.2E-01	mg/kg	6.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Dermal Absorption									2.E-08
	Age 0 -2 years	5.2E-01	mg/kg	1.0E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-08	
	Age 2 - 6 years	5.2E-01	mg/kg	2.0E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.E-09	
	Inhalation									3.E-13
	Age 0 -2 years	3.8E-10	mg/m3	3.0E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	2.E-13	
	Age 2 - 6 years	3.8E-10	mg/m3	6.0E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-13	
Chromium	Ingestion									2.E-06
	Age 0 -2 years	4.9E+00	mg/kg	3.1E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	2.E-06	
	Age 2 - 6 years	4.9E+00	mg/kg	6.2E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	9.E-07	
	Dermal Absorption									2.E-06
	Age 0 -2 years	4.9E+00	mg/kg	7.3E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	1.E-06	
	Age 2 - 6 years	4.9E+00	mg/kg	1.5E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	9.E-07	
	Inhalation									4.E-09
	Age 0 -2 years	3.6E-09	mg/m3	2.8E-12	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	10	2.E-09	
	Age 2 - 6 years	3.6E-09	mg/m3	5.7E-12	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	1.E-09	

Table 8.72
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.9E-10	mg/kg-day	2.9E-02	$(mg/kg-day)^{-1}$	5.E-12
	Chlorobenzene	3.4E+01	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.8E-08	mg/kg-day	5.4E-03	$(mg/kg-day)^{-1}$	2.E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.72a for mutagenic calculations				9.E-09
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.72a for mutagenic calculations				8.E-08
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.72a for mutagenic calculations				6.E-09
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.9E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	3.E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.72a for mutagenic calculations				2.E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.72a for mutagenic calculations				5.E-09
	Dieldrin	2.3E-03	mg/kg	8.8E-11	mg/kg-day	1.6E+01	$(mg/kg-day)^{-1}$	1.E-09
	4,4'-DDT	3.5E-03	mg/kg	1.4E-10	mg/kg-day	3.4E-01	$(mg/kg-day)^{-1}$	5.E-11
	Heptachlor epoxide	9.1E-03	mg/kg	3.5E-10	mg/kg-day	9.1E+00	$(mg/kg-day)^{-1}$	3.E-09
	Aroclor 1248	8.7E+01	mg/kg	3.4E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	7.E-06
	Aroclor 1254	5.8E+01	mg/kg	2.3E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.E-06
	Aroclor 1260	2.7E+01	mg/kg	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	2.8E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	6.E-05
	Aluminum	3.2E+04	mg/kg	1.3E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	3.2E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	5.E-07
	Barium	3.4E+02	mg/kg	1.3E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	7.0E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	7.6E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	8.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.72a for mutagenic calculations				2.E-07
	Cobalt	1.7E+02	mg/kg	6.6E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	1.9E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	2.9E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.8E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	2.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.4E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.6E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	3.8E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	2.0E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	pCi/g	3.7E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-06
	2,3,7,8-TCDD TEQ	2.9E-04	pCi/g	1.1E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	1.E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	1.1E+04	pCi/g	9.E-11
	Bismuth-214	1.7E+02	pCi/g	--	--	3.7E+00	pCi/g	5.E-05
	Cesium-137	9.4E-02	pCi/g	--	--	4.4E+02	pCi/g	2.E-10
	Lead-210	2.2E+02	pCi/g	--	--	3.7E+00	pCi/g	6.E-05
	Lead-212	8.2E-01	pCi/g	--	--	2.9E+02	pCi/g	3.E-09
	Lead-214	1.9E+02	pCi/g	--	--	3.7E+00	pCi/g	5.E-05
	Potassium-40	9.1E+00	pCi/g	--	--	3.2E+02	pCi/g	3.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	3.1E+00	pCi/g	9.E-07
	Radium-226	3.5E+01	pCi/g	--	--	3.3E+00	pCi/g	1.E-05
	Radium-228	8.5E-01	pCi/g	--	--	6.8E+00	pCi/g	1.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	3.1E+00	pCi/g	4.E-07
	Uranium-235	1.2E-01	pCi/g	--	--	1.3E+01	pCi/g	9.E-09
Ingestion Route Total								2.E-04

Table 8.72
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.2E-10	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	3.E-12
	Chlorobenzene	3.4E+01	mg/kg	8.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	7.7E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	4.E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.72a for mutagenic calculations				2.E-08
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.72a for mutagenic calculations				2.E-07
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.72a for mutagenic calculations				2.E-08
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	3.9E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	5.E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.72a for mutagenic calculations				6.E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.72a for mutagenic calculations				1.E-08
	Dieldrin	2.3E-03	mg/kg	1.8E-10	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.E-09
	4,4'-DDT	3.5E-03	mg/kg	8.4E-11	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.E-11
	Heptachlor epoxide	9.1E-03	mg/kg	7.2E-10	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	7.E-09
	Aroclor 1248	8.7E+01	mg/kg	9.7E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Aroclor 1254	5.8E+01	mg/kg	6.4E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Aroclor 1260	2.7E+01	mg/kg	3.0E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	8.1E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Aluminum	3.2E+04	mg/kg	2.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	2.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	3.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Barium	3.4E+02	mg/kg	2.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	1.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	1.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	1.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.72a for mutagenic calculations				2.E-06
	Cobalt	1.7E+02	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	3.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	3.0E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	5.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	3.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	4.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	2.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	3.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	3.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	7.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	4.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	3.6E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	1.1E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-05
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	6.9E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	9.E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	5.98E-01	pCi/g	2.E-06
	Bismuth-214	1.7E+02	pCi/g	--	--	5.66E-01	pCi/g	3.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	1.61E+00	pCi/g	6.E-08
	Lead-210	2.2E+02	pCi/g	--	--	9.80E+02	pCi/g	2.E-07
	Lead-212	8.2E-01	pCi/g	--	--	5.61E-01	pCi/g	1.E-06
	Lead-214	1.9E+02	pCi/g	--	--	4.98E-01	pCi/g	4.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	5.34E+00	pCi/g	2.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	4.90E-01	pCi/g	6.E-06
	Radium-226	3.5E+01	pCi/g	--	--	4.96E-01	pCi/g	7.E-05
	Radium-228	8.5E-01	pCi/g	--	--	3.63E-01	pCi/g	2.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	2.32E-01	pCi/g	1.E-06
	Thorium-234	1.1E+00	pCi/g	--	--	4.89E-01	pCi/g	2.E-06
	Uranium-235	1.2E-01	pCi/g	--	--	1.79E+00	pCi/g	6.E-08
Dermal Absorption Route Total								1.E-03

Table 8.72
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Total Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	7.3E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	1.6E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.9E-07	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	3.E-09
	Benzo(a)anthracene	2.0E-07	mg/m^3	See Table 8.72a for mutagenic calculations				1.E-10
	Benzo(a)pyrene	6.2E-10	mg/m^3	See Table 8.72a for mutagenic calculations				3.E-12
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	See Table 8.72a for mutagenic calculations				2.E-13
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	1.3E-11	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	3.E-14
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	See Table 8.72a for mutagenic calculations				9.E-13
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	See Table 8.72a for mutagenic calculations				2.E-13
	Dieldrin	1.7E-12	mg/m^3	5.9E-15	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	3.E-14
	4,4'-DDT	2.6E-12	mg/m^3	9.1E-15	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	9.E-16
	Heptachlor epoxide	6.7E-12	mg/m^3	2.4E-14	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	6.E-14
	Aroclor 1248	1.3E-04	mg/m^3	4.6E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-07
	Aroclor 1254	6.4E-05	mg/m^3	2.3E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-07
	Aroclor 1260	1.9E-05	mg/m^3	6.8E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-08
	High Risk PCB Congeners	1.3E-03	mg/m^3	4.5E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-06
	Aluminum	2.4E-05	mg/m^3	8.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	7.0E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	3.6E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	2.E-10
	Barium	2.5E-07	mg/m^3	8.8E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	4.7E-12	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	1.E-11
	Cadmium	1.4E-08	mg/m^3	5.1E-11	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	9.E-11
	Chromium (Total)	1.6E-06	mg/m^3	5.6E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	See Table 8.72a for mutagenic calculations				3.E-09
	Cobalt	1.2E-07	mg/m^3	4.4E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	4.E-09
	Copper	3.6E-06	mg/m^3	1.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	9.8E-13	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	1.9E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	1.2E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	1.5E-09	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	4.E-10
	Selenium	2.7E-09	mg/m^3	9.4E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	1.1E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	1.1E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	2.6E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	1.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	1.7E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.6E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	6.E-08
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	4.8E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	2.E-08
	Bismuth-212	1.0E+00	pCi/g	--	--	6.7E+06	pCi/g	2.E-13
	Bismuth-214	1.7E+02	pCi/g	--	--	2.4E+04	pCi/g	7.E-09
	Cesium-137	9.4E-02	pCi/g	--	--	6.7E+06	pCi/g	1.E-14
	Lead-210	2.2E+02	pCi/g	--	--	2.5E+04	pCi/g	9.E-09
	Lead-212	8.2E-01	pCi/g	--	--	1.0E+06	pCi/g	8.E-13
	Lead-214	1.9E+02	pCi/g	--	--	2.4E+04	pCi/g	8.E-09
	Potassium-40	9.1E+00	pCi/g	--	--	3.4E+06	pCi/g	3.E-12
	Protactinium-234M	2.7E+00	pCi/g	--	--	6.2E+03	pCi/g	4.E-10
	Radium-226	3.5E+01	pCi/g	--	--	1.3E+04	pCi/g	3.E-09
	Radium-228	8.5E-01	pCi/g	--	--	4.0E+03	pCi/g	2.E-10
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	6.2E+03	pCi/g	2.E-10
	Uranium-235	1.2E-01	pCi/g	--	--	2.4E+03	pCi/g	5.E-11
Inhalation Route Total								3.E-06
							Total of Receptor Risks Across All Media	1.E-03

Table 8.72a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									9.E-09
	Age 9 - 16 years	9.4E-01	mg/kg	2.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	8.E-09	
	Age 16 - 18 years	9.4E-01	mg/kg	8.1E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	8.E-10	
	Dermal Absorption									2.E-08
	Age 9 - 16 years	9.4E-01	mg/kg	7.5E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 18 years	9.4E-01	mg/kg	2.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-09	
	Inhalation									1.E-10
	Age 9 - 16 years	2.0E-07	mg/m3	5.4E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-10	
	Age 16 - 18 years	2.0E-07	mg/m3	1.6E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	9.E-12	
Benzo(a)pyrene	Ingestion									8.E-08
	Age 9 - 16 years	8.5E-01	mg/kg	2.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	8.E-08	
	Age 16 - 18 years	8.5E-01	mg/kg	7.3E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	7.E-09	
	Dermal Absorption									2.E-07
	Age 9 - 16 years	8.5E-01	mg/kg	6.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 18 years	8.5E-01	mg/kg	1.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.E-08	
	Inhalation									3.E-12
	Age 9 - 16 years	6.2E-10	mg/m3	1.7E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	3.E-12	
	Age 16 - 18 years	6.2E-10	mg/m3	4.9E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	3.E-13	
Benzo(b)fluoranthene	Ingestion									6.E-09
	Age 9 - 16 years	6.3E-01	mg/kg	1.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.E-09	
	Age 16 - 18 years	6.3E-01	mg/kg	5.4E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	5.E-10	
	Dermal Absorption									2.E-08
	Age 9 - 16 years	6.3E-01	mg/kg	5.0E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 18 years	6.3E-01	mg/kg	1.4E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-09	
	Inhalation									2.E-13
	Age 9 - 16 years	4.6E-10	mg/m3	1.3E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-13	
	Age 16 - 18 years	4.6E-10	mg/m3	3.6E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	2.E-14	

Table 8.72a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adolescent

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Dibenzo(a.h)anthracene	Ingestion									2.E-08
	Age 9 - 16 years	2.3E-01	mg/kg	6.9E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 18 years	2.3E-01	mg/kg	2.0E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.E-09	
	Dermal Absorption									6.E-08
	Age 9 - 16 years	2.3E-01	mg/kg	1.8E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 18 years	2.3E-01	mg/kg	5.2E-09	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.E-09	
	Inhalation									9.E-13
	Age 9 - 16 years	1.7E-10	mg/m3	4.6E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	8.E-13	
	Age 16 - 18 years	1.7E-10	mg/m3	1.3E-13	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	8.E-14	
Indeno(1,2,3-c,d)pyrene	Ingestion									5.E-09
	Age 9 - 16 years	5.2E-01	mg/kg	1.6E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-09	
	Age 16 - 18 years	5.2E-01	mg/kg	4.5E-09	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	4.E-10	
	Dermal Absorption									1.E-08
	Age 9 - 16 years	5.2E-01	mg/kg	4.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-08	
	Age 16 - 18 years	5.2E-01	mg/kg	1.2E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-09	
	Inhalation									2.E-13
	Age 9 - 16 years	3.8E-10	mg/m3	1.0E-12	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-13	
	Age 16 - 18 years	3.8E-10	mg/m3	3.0E-13	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	2.E-14	
Chromium	Ingestion									2.E-07
	Age 9 - 16 years	4.9E+00	mg/kg	1.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 18 years	4.9E+00	mg/kg	4.3E-08	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.E-08	
	Dermal Absorption									2.E-06
	Age 9 - 16 years	4.9E+00	mg/kg	3.0E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 18 years	4.9E+00	mg/kg	8.7E-09	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	2.E-07	
	Inhalation									3.E-09
	Age 9 - 16 years	3.6E-09	mg/m3	1.0E-11	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	3.E-09	
	Age 16 - 18 years	3.6E-09	mg/m3	2.8E-12	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	1	2.E-10	

Table 8.73
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	2.9E-10	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	8.3E-12
	Chlorobenzene	3.4E+01	mg/kg	2.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	5.7E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	3.1E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	5.5E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	5.5E-09
	Benzo(a)pyrene	8.5E-01	mg/kg	5.0E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	5.0E-08
	Benzo(b)fluoranthene	6.3E-01	mg/kg	3.7E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-09
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.9E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	1.3E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	3.0E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Dieldrin	2.3E-03	mg/kg	1.3E-10	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	4,4'-DDT	3.5E-03	mg/kg	2.1E-10	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	7.0E-11
	Heptachlor epoxide	9.1E-03	mg/kg	5.3E-10	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-09
	Aroclor 1248	8.7E+01	mg/kg	5.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-05
	Aroclor 1254	5.8E+01	mg/kg	3.4E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.8E-06
	Aroclor 1260	2.7E+01	mg/kg	1.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	4.3E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-05
	Aluminum	3.2E+04	mg/kg	1.9E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	1.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	4.9E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	7.3E-07
	Barium	3.4E+02	mg/kg	2.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	1.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	2.9E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-07
	Cobalt	1.7E+02	mg/kg	1.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	2.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	2.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	4.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	2.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	3.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	2.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	2.5E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	2.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	5.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	3.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	2.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	5.7E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	7.4E-06
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.7E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	4.96E+03	pCi/g	2.E-10
	Bismuth-214	1.7E+02	pCi/g	--	--	1.66E+00	pCi/g	1.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	1.96E+02	pCi/g	5.E-10
	Lead-210	2.2E+02	pCi/g	--	--	1.66E+00	pCi/g	1.E-04
	Lead-212	8.2E-01	pCi/g	--	--	1.28E+02	pCi/g	6.E-09
	Lead-214	1.9E+02	pCi/g	--	--	1.66E+00	pCi/g	1.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	1.43E+02	pCi/g	6.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.39E+00	pCi/g	2.E-06
	Radium-226	3.5E+01	pCi/g	--	--	1.46E+00	pCi/g	2.E-05
	Radium-228	8.5E-01	pCi/g	--	--	3.07E+00	pCi/g	3.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.37E+00	pCi/g	8.E-07
	Uranium-235	1.2E-01	pCi/g	--	--	5.67E+00	pCi/g	2.E-08
Ingestion Route Total								5.E-04

Table 8.73
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal								
Absorption								
and External	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	3.6E-11	mg/kg-day	2.9E-02	$(mg/kg-day)^{-1}$	1.0E-12
Exposure to	Chlorobenzene	3.4E+01	mg/kg	2.5E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
Ionizing	1,4-Dichlorobenzene	9.7E-01	mg/kg	2.4E-08	mg/kg-day	5.4E-03	$(mg/kg-day)^{-1}$	1.3E-10
Radiation	Benzo(a)anthracene	9.4E-01	mg/kg	3.0E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	3.0E-09
	Benzo(a)pyrene	8.5E-01	mg/kg	2.7E-08	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	2.7E-08
	Benzo(b)fluoranthene	6.3E-01	mg/kg	2.0E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	2.0E-09
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.2E-07	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	1.7E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	7.3E-09	mg/kg-day	1.0E+00	$(mg/kg-day)^{-1}$	7.3E-09
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.7E-08	mg/kg-day	1.0E-01	$(mg/kg-day)^{-1}$	1.7E-09
	Dieldrin	2.3E-03	mg/kg	5.7E-11	mg/kg-day	1.6E+01	$(mg/kg-day)^{-1}$	9.0E-10
	4,4'-DDT	3.5E-03	mg/kg	2.6E-11	mg/kg-day	3.4E-01	$(mg/kg-day)^{-1}$	8.9E-12
	Heptachlor epoxide	9.1E-03	mg/kg	2.3E-10	mg/kg-day	9.1E+00	$(mg/kg-day)^{-1}$	2.1E-09
	Aroclor 1248	8.7E+01	mg/kg	3.0E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	6.1E-06
	Aroclor 1254	5.8E+01	mg/kg	2.0E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	4.0E-06
	Aroclor 1260	2.7E+01	mg/kg	9.5E-07	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.9E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	2.5E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	5.1E-05
	Aluminum	3.2E+04	mg/kg	8.0E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	6.7E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.0E-07	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	1.5E-07
	Barium	3.4E+02	mg/kg	8.4E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	4.5E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	4.9E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	5.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.2E-08	mg/kg-day	2.0E+01	$(mg/kg-day)^{-1}$	2.5E-07
	Cobalt	1.7E+02	mg/kg	4.2E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	1.2E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	9.3E-10	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	1.8E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	1.4E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	9.0E-09	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.0E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	2.5E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	1.3E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.1E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	3.4E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	4.4E-06
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	2.2E-12	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	2.8E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	2.69E-01	pCi/g	4.E-06
	Bismuth-214	1.7E+02	pCi/g	--	--	2.55E-01	pCi/g	7.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	7.22E-01	pCi/g	1.E-07
	Lead-210	2.2E+02	pCi/g	--	--	4.41E+02	pCi/g	5.E-07
	Lead-212	8.2E-01	pCi/g	--	--	2.52E-01	pCi/g	3.E-06
	Lead-214	1.9E+02	pCi/g	--	--	2.24E-01	pCi/g	8.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	2.40E+00	pCi/g	4.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.21E-01	pCi/g	1.E-05
	Radium-226	3.5E+01	pCi/g	--	--	2.23E-01	pCi/g	2.E-04
	Radium-228	8.5E-01	pCi/g	--	--	1.63E-01	pCi/g	5.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	1.04E-01	pCi/g	3.E-06
	Thorium-234	1.1E+00	pCi/g	--	--	2.20E-01	pCi/g	5.E-06
	Uranium-235	1.2E-01	pCi/g	--	--	8.08E-01	pCi/g	1.E-07
Dermal Absorption Route Total								2.E-03

Table 8.73
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Future Surface Soil
Exposure Point: Site Soil
Receptor Population: Recreational User/Fisherman/Trespasser/Visitor
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	1.6E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	3.6E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	6.3E-07	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	7.0E-09
	Benzo(a)anthracene	2.0E-07	mg/m^3	1.6E-09	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	9.3E-11
	Benzo(a)pyrene	6.2E-10	mg/m^3	4.9E-12	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	2.9E-12
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	3.6E-12	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	2.2E-13
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	2.8E-11	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	6.8E-14
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	1.3E-12	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	7.9E-13
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	3.0E-12	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	1.8E-13
	Dieldrin	1.7E-12	mg/m^3	1.3E-14	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	6.0E-14
	4,4'-DDT	2.6E-12	mg/m^3	2.0E-14	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	2.0E-15
	Heptachlor epoxide	6.7E-12	mg/m^3	5.2E-14	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	1.4E-13
	Aroclor 1248	1.3E-04	mg/m^3	1.0E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.8E-07
	Aroclor 1254	6.4E-05	mg/m^3	5.0E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.9E-07
	Aroclor 1260	1.9E-05	mg/m^3	1.5E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	8.7E-08
	High Risk PCB Congeners	1.3E-03	mg/m^3	1.0E-05	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.7E-06
	Aluminum	2.4E-05	mg/m^3	1.9E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	1.6E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	8.0E-11	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	3.4E-10
	Barium	2.5E-07	mg/m^3	1.9E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	1.0E-11	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	2.5E-11
	Cadmium	1.4E-08	mg/m^3	1.1E-10	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	2.0E-10
	Chromium (Total)	1.6E-06	mg/m^3	1.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	2.8E-11	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	2.4E-09
	Cobalt	1.2E-07	mg/m^3	9.8E-10	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	8.8E-09
	Copper	3.6E-06	mg/m^3	2.8E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	2.2E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	4.3E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	2.7E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	3.3E-09	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	7.9E-10
	Selenium	2.7E-09	mg/m^3	2.1E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	2.5E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	2.4E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	5.7E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	2.9E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	3.8E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	3.6E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.4E-07
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	1.1E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	4.1E-08
	Bismuth-212	1.0E+00	pCi/g	--	--	3.01E+06	pCi/g	3.5E-13
	Bismuth-214	1.7E+02	pCi/g	--	--	1.10E+04	pCi/g	1.5E-08
	Cesium-137	9.4E-02	pCi/g	--	--	3.02E+06	pCi/g	3.1E-14
	Lead-210	2.2E+02	pCi/g	--	--	1.10E+04	pCi/g	2.0E-08
	Lead-212	8.2E-01	pCi/g	--	--	4.58E+05	pCi/g	1.8E-12
	Lead-214	1.9E+02	pCi/g	--	--	1.10E+04	pCi/g	1.7E-08
	Potassium-40	9.1E+00	pCi/g	--	--	1.53E+06	pCi/g	6.0E-12
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.81E+03	pCi/g	9.7E-10
	Radium-226	3.5E+01	pCi/g	--	--	5.75E+03	pCi/g	6.1E-09
	Radium-228	8.5E-01	pCi/g	--	--	1.81E+03	pCi/g	4.7E-10
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	2.81E+03	pCi/g	3.8E-10
	Uranium-235	1.2E-01	pCi/g	--	--	1.08E+03	pCi/g	1.1E-10
Inhalation Route Total								7.E-06
							Total of Receptor Risks Across All Media	2.E-03

Table 8.74
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.6E-11	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-13
	Chlorobenzene	3.4E+01	mg/kg	1.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.1E-09	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-11
	Benzo(a)anthracene	9.4E-01	mg/kg	3.0E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Benzo(a)pyrene	8.5E-01	mg/kg	2.7E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Benzo(b)fluoranthene	6.3E-01	mg/kg	2.0E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	1.6E-08	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-10
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	7.4E-10	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	7.4E-10
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	1.7E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-10
	Dieldrin	2.3E-03	mg/kg	7.4E-12	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-10
	4,4'-DDT	3.5E-03	mg/kg	1.1E-11	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.9E-12
	Heptachlor epoxide	9.1E-03	mg/kg	2.9E-11	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Aroclor 1248	8.7E+01	mg/kg	2.8E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Aroclor 1254	5.8E+01	mg/kg	1.9E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-07
	Aroclor 1260	2.7E+01	mg/kg	8.8E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	High Risk PCB Congeners	7.3E+02	mg/kg	2.4E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-06
	Aluminum	3.2E+04	mg/kg	1.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	8.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	2.7E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-08
	Barium	3.4E+02	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	5.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	6.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	7.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	1.6E-08	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	8.0E-09
	Cobalt	1.7E+02	mg/kg	5.5E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.2E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	2.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.5E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	1.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.2E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	3.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	1.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	3.1E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	9.4E-13	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	3.41E+05	pCi/g	3.E-12
	Bismuth-214	1.7E+02	pCi/g	--	--	7.43E+01	pCi/g	2.E-06
	Cesium-137	9.4E-02	pCi/g	--	--	4.77E+03	pCi/g	2.E-11
	Lead-210	2.2E+02	pCi/g	--	--	7.43E+01	pCi/g	3.E-06
	Lead-212	8.2E-01	pCi/g	--	--	1.12E+04	pCi/g	7.E-11
	Lead-214	1.9E+02	pCi/g	--	--	7.43E+01	pCi/g	2.E-06
	Potassium-40	9.1E+00	pCi/g	--	--	1.01E+04	pCi/g	9.E-10
	Protactinium-234M	2.7E+00	pCi/g	--	--	6.15E+01	pCi/g	4.E-08
	Radium-226	3.5E+01	pCi/g	--	--	6.49E+01	pCi/g	5.E-07
	Radium-228	8.5E-01	pCi/g	--	--	1.82E+02	pCi/g	5.E-09
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	6.13E+01	pCi/g	2.E-08
	Uranium-235	1.2E-01	pCi/g	--	--	2.76E+02	pCi/g	4.E-10
Ingestion Route Total								1.E-05

Table 8.74
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.5E-12	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	4.4E-14
	Chlorobenzene	3.4E+01	mg/kg	1.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.0E-09	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	5.4E-12
	Benzo(a)anthracene	9.4E-01	mg/kg	1.3E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-10
	Benzo(a)pyrene	8.5E-01	mg/kg	1.1E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Benzo(b)fluoranthene	6.3E-01	mg/kg	8.5E-10	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	8.5E-11
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	5.1E-09	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-11
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	3.1E-10	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-10
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	7.0E-10	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	7.0E-11
	Dieldrin	2.3E-03	mg/kg	2.4E-12	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	3.8E-11
	4,4'-DDT	3.5E-03	mg/kg	1.1E-12	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-13
	Heptachlor epoxide	9.1E-03	mg/kg	9.4E-12	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-11
	Aroclor 1248	8.7E+01	mg/kg	1.3E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Aroclor 1254	5.8E+01	mg/kg	8.4E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Aroclor 1260	2.7E+01	mg/kg	4.0E-08	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.9E-08
	High Risk PCB Congeners	7.3E+02	mg/kg	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Aluminum	3.2E+04	mg/kg	3.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	2.8E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	4.3E-09	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-09
	Barium	3.4E+02	mg/kg	3.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	1.9E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	2.0E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	2.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	5.1E-10	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Cobalt	1.7E+02	mg/kg	1.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	5.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	3.9E-11	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	7.7E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	4.8E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	5.9E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	3.8E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	4.5E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	4.3E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	1.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	5.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	4.7E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	1.4E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	9.0E-14	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Bismuth-212	1.0E+00	pCi/g	--	--	8.08E+00	pCi/g	1.E-07
	Bismuth-214	1.7E+02	pCi/g	--	--	7.65E+00	pCi/g	2.E-05
	Cesium-137	9.4E-02	pCi/g	--	--	2.17E+01	pCi/g	4.E-09
	Lead-210	2.2E+02	pCi/g	--	--	1.32E+04	pCi/g	2.E-08
	Lead-212	8.2E-01	pCi/g	--	--	7.57E+00	pCi/g	1.E-07
	Lead-214	1.9E+02	pCi/g	--	--	6.72E+00	pCi/g	3.E-05
	Potassium-40	9.1E+00	pCi/g	--	--	7.21E+01	pCi/g	1.E-07
	Protactinium-234M	2.7E+00	pCi/g	--	--	6.62E+00	pCi/g	4.E-07
	Radium-226	3.5E+01	pCi/g	--	--	6.70E+00	pCi/g	5.E-06
	Radium-228	8.5E-01	pCi/g	--	--	4.89E+00	pCi/g	2.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	3.13E+00	pCi/g	9.E-08
	Thorium-234	1.1E+00	pCi/g	--	--	6.61E+00	pCi/g	2.E-07
	Uranium-235	1.2E-01	pCi/g	--	--	2.42E+01	pCi/g	5.E-09
Dermal Absorption Route Total								6.E-05

Table 8.74
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Utility Trench within Site
Receptor Population: Utility Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	5.4E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	1.2E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.1E-08	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	2.3E-10
	Benzo(a)anthracene	2.0E-07	mg/m^3	5.2E-11	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	3.1E-12
	Benzo(a)pyrene	6.2E-10	mg/m^3	1.6E-13	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	9.8E-14
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	1.2E-13	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	7.2E-15
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	9.4E-13	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	2.3E-15
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	4.4E-14	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	2.6E-14
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	9.9E-14	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	6.0E-15
	Dieldrin	1.7E-12	mg/m^3	4.4E-16	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	2.0E-15
	4,4'-DDT	2.6E-12	mg/m^3	6.8E-16	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	6.6E-17
	Heptachlor epoxide	6.7E-12	mg/m^3	1.7E-15	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	4.5E-15
	Aroclor 1248	1.3E-04	mg/m^3	3.4E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.9E-08
	Aroclor 1254	6.4E-05	mg/m^3	1.7E-08	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.5E-09
	Aroclor 1260	1.9E-05	mg/m^3	5.1E-09	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.9E-09
	High Risk PCB Congeners	1.3E-03	mg/m^3	3.3E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.9E-07
	Aluminum	2.4E-05	mg/m^3	6.2E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	5.2E-12	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	2.7E-12	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	1.1E-11
	Barium	2.5E-07	mg/m^3	6.5E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	3.4E-13	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	8.3E-13
	Cadmium	1.4E-08	mg/m^3	3.8E-12	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	6.8E-12
	Chromium (Total)	1.6E-06	mg/m^3	4.2E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	9.5E-13	mg/m^3	8.4E+01	$(mg/m^3)^{-1}$	8.0E-11
	Cobalt	1.2E-07	mg/m^3	3.3E-11	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	2.9E-10
	Copper	3.6E-06	mg/m^3	9.4E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	7.2E-14	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	1.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	8.9E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	1.1E-10	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	2.6E-11
	Selenium	2.7E-09	mg/m^3	7.0E-13	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	8.3E-13	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	8.0E-13	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	1.9E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	9.8E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	1.3E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.2E-13	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	4.5E-09
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	3.6E-14	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	1.4E-09
	Bismuth-212	1.0E+00	pCi/g	--	--	2.48E+06	pCi/g	4.2E-13
	Bismuth-214	1.7E+02	pCi/g	--	--	9.06E+03	pCi/g	1.9E-08
	Cesium-137	9.4E-02	pCi/g	--	--	2.49E+06	pCi/g	3.8E-14
	Lead-210	2.2E+02	pCi/g	--	--	9.08E+03	pCi/g	2.4E-08
	Lead-212	8.2E-01	pCi/g	--	--	3.77E+05	pCi/g	2.2E-12
	Lead-214	1.9E+02	pCi/g	--	--	9.04E+03	pCi/g	2.1E-08
	Potassium-40	9.1E+00	pCi/g	--	--	1.26E+06	pCi/g	7.3E-12
	Protactinium-234M	2.7E+00	pCi/g	--	--	2.31E+03	pCi/g	1.2E-09
	Radium-226	3.5E+01	pCi/g	--	--	4.73E+03	pCi/g	7.4E-09
	Radium-228	8.5E-01	pCi/g	--	--	1.49E+03	pCi/g	5.7E-10
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	2.31E+03	pCi/g	4.7E-10
	Uranium-235	1.2E-01	pCi/g	--	--	8.90E+02	pCi/g	1.3E-10
Inhalation Route Total								3.E-07
							Total of Receptor Risks Across All Media	7.E-05

Table 8.75
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	2.0E-10	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	6.E-12
	Chlorobenzene	3.4E+01	mg/kg	1.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.9E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	2.E-10
	Benzo(a)anthracene	9.4E-01	mg/kg	3.8E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Benzo(a)pyrene	8.5E-01	mg/kg	3.4E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Benzo(b)fluoranthene	6.3E-01	mg/kg	2.5E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.0E-07	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	9.2E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	9.E-09
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	2.1E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Dieldrin	2.3E-03	mg/kg	9.2E-11	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	1.E-09
	4,4'-DDT	3.5E-03	mg/kg	1.4E-10	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	5.E-11
	Heptachlor epoxide	9.1E-03	mg/kg	3.7E-10	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	3.E-09
	Aroclor 1248	8.7E+01	mg/kg	3.5E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.E-06
	Aroclor 1254	5.8E+01	mg/kg	2.3E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-06
	Aroclor 1260	2.7E+01	mg/kg	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	2.9E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	6.E-05
	Aluminum	3.2E+04	mg/kg	1.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	3.3E-07	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	5.E-07
	Barium	3.4E+02	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	7.3E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	7.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	8.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	2.0E-07	mg/kg-day	5.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Cobalt	1.7E+02	mg/kg	6.8E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	2.0E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	3.0E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	2.3E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.5E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.7E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	4.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	2.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	3.9E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.E-06
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	2.73E+04	pCi/g	4.E-11
	Bismuth-214	1.7E+02	pCi/g	--	--	5.95E+00	pCi/g	3.E-05
	Cesium-137	9.4E-02	pCi/g	--	--	3.81E+02	pCi/g	2.E-10
	Lead-210	2.2E+02	pCi/g	--	--	5.95E+00	pCi/g	4.E-05
	Lead-212	8.2E-01	pCi/g	--	--	8.93E+02	pCi/g	9.E-10
	Lead-214	1.9E+02	pCi/g	--	--	5.94E+00	pCi/g	3.E-05
	Potassium-40	9.1E+00	pCi/g	--	--	8.05E+02	pCi/g	1.E-08
	Protactinium-234M	2.7E+00	pCi/g	--	--	4.92E+00	pCi/g	6.E-07
	Radium-226	3.5E+01	pCi/g	--	--	5.19E+00	pCi/g	7.E-06
	Radium-228	8.5E-01	pCi/g	--	--	1.46E+01	pCi/g	6.E-08
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	4.90E+00	pCi/g	2.E-07
	Uranium-235	1.2E-01	pCi/g	--	--	2.21E+01	pCi/g	5.E-09
Exposure Route Total								2.E-04

Table 8.75
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal								
Absorption								
and External	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	1.9E-11	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	5.E-13
Exposure to	Chlorobenzene	3.4E+01	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
Ionizing	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.3E-08	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	7.E-11
Radiation	Benzo(a)anthracene	9.4E-01	mg/kg	1.6E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Benzo(a)pyrene	8.5E-01	mg/kg	1.4E-08	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-08
	Benzo(b)fluoranthene	6.3E-01	mg/kg	1.1E-08	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	6.4E-08	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	9.E-10
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	3.8E-09	mg/kg-day	1.0E+00	$(mg/kg\text{-}day)^{-1}$	4.E-09
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	8.7E-09	mg/kg-day	1.0E-01	$(mg/kg\text{-}day)^{-1}$	9.E-10
	Dieldrin	2.3E-03	mg/kg	3.0E-11	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	5.E-10
	4,4'-DDT	3.5E-03	mg/kg	1.4E-11	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	5.E-12
	Heptachlor epoxide	9.1E-03	mg/kg	1.2E-10	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	1.E-09
	Aroclor 1248	8.7E+01	mg/kg	1.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aroclor 1254	5.8E+01	mg/kg	1.1E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-06
	Aroclor 1260	2.7E+01	mg/kg	5.0E-07	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-06
	High Risk PCB Congeners	7.3E+02	mg/kg	1.3E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-05
	Aluminum	3.2E+04	mg/kg	4.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	3.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.8E-08	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-08
	Barium	3.4E+02	mg/kg	1.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	2.3E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	2.5E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	2.8E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	6.4E-09	mg/kg-day	2.0E+01	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Cobalt	1.7E+02	mg/kg	2.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	6.3E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	4.9E-10	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	9.6E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	6.0E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	7.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	4.7E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	5.6E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	5.4E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	1.3E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	6.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	5.9E-09	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	1.8E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-06
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	1.1E-12	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	6.46E-01	pCi/g	2.E-06
	Bismuth-214	1.7E+02	pCi/g	--	--	6.12E-01	pCi/g	3.E-04
	Cesium-137	9.4E-02	pCi/g	--	--	1.73E+00	pCi/g	5.E-08
	Lead-210	2.2E+02	pCi/g	--	--	1.06E+03	pCi/g	2.E-07
	Lead-212	8.2E-01	pCi/g	--	--	6.05E-01	pCi/g	1.E-06
	Lead-214	1.9E+02	pCi/g	--	--	5.38E-01	pCi/g	3.E-04
	Potassium-40	9.1E+00	pCi/g	--	--	5.77E+00	pCi/g	2.E-06
	Protactinium-234M	2.7E+00	pCi/g	--	--	5.30E-01	pCi/g	5.E-06
	Radium-226	3.5E+01	pCi/g	--	--	5.36E-01	pCi/g	7.E-05
	Radium-228	8.5E-01	pCi/g	--	--	3.92E-01	pCi/g	2.E-06
	Thallium-208	2.7E-01	pCi/g	--	--	2.50E-01	pCi/g	1.E-06
	Thorium-234	1.1E+00	pCi/g	--	--	5.28E-01	pCi/g	2.E-06
	Uranium-235	1.2E-01	pCi/g	--	--	1.94E+00	pCi/g	6.E-08
Exposure Route Total								7.E-04

Table 8.75
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Medium: Site Soil (Combined Surface and Subsurface Soil)
Exposure Medium: Site Soil
Exposure Point: Soil and Dust Emissions
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Value	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Units	
Inhalation								
	1,2,4-Trichlorobenzene	2.0E-06	mg/m^3	6.6E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.5E-02	mg/m^3	1.5E-04	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	7.9E-04	mg/m^3	2.6E-06	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	3.E-08
	Benzo(a)anthracene	2.1E-06	mg/m^3	7.0E-09	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	4.E-10
	Benzo(a)pyrene	1.9E-07	mg/m^3	6.3E-10	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	4.E-10
	Benzo(b)fluoranthene	1.4E-07	mg/m^3	4.6E-10	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	3.E-11
	Bis(2-ethylhexyl)phthalate	1.1E-06	mg/m^3	3.6E-09	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	9.E-12
	Dibenzo(a,h)anthracene	5.2E-08	mg/m^3	1.7E-10	mg/m^3	6.0E-01	$(mg/m^3)^{-1}$	1.E-10
	Indeno(1,2,3-cd)pyrene	1.2E-07	mg/m^3	3.8E-10	mg/m^3	6.0E-02	$(mg/m^3)^{-1}$	2.E-11
	Dieldrin	5.2E-10	mg/m^3	1.7E-12	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	8.E-12
	4,4'-DDT	8.0E-10	mg/m^3	2.6E-12	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	3.E-13
	Heptachlor epoxide	2.1E-09	mg/m^3	6.7E-12	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	2.E-11
	Aroclor 1248	1.3E-03	mg/m^3	4.2E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	2.E-06
	Aroclor 1254	6.4E-04	mg/m^3	2.1E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-06
	Aroclor 1260	2.0E-04	mg/m^3	6.4E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-07
	High Risk PCB Congeners	1.3E-02	mg/m^3	4.1E-05	mg/m^4	5.7E-01	$(mg/m^3)^{-1}$	2.E-05
	Aluminum	7.3E-03	mg/m^3	2.4E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	6.2E-06	mg/m^3	2.0E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	3.1E-06	mg/m^3	1.0E-08	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	4.E-08
	Barium	7.7E-05	mg/m^3	2.5E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	4.1E-07	mg/m^3	1.3E-09	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	3.E-09
	Cadmium	4.5E-06	mg/m^3	1.5E-08	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	3.E-08
	Chromium (Total)	4.9E-04	mg/m^3	1.6E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	1.1E-06	mg/m^3	3.7E-09	mg/m^4	8.4E+01	$(mg/m^3)^{-1}$	3.E-07
	Cobalt	3.8E-05	mg/m^3	1.3E-07	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	1.E-06
	Copper	1.1E-03	mg/m^3	3.6E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	8.5E-08	mg/m^3	2.8E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	1.7E-02	mg/m^3	5.5E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	1.0E-04	mg/m^3	3.4E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	1.3E-04	mg/m^3	4.2E-07	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	1.E-07
	Selenium	8.2E-07	mg/m^3	2.7E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	9.8E-07	mg/m^3	3.2E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	9.4E-07	mg/m^3	3.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	2.2E-05	mg/m^3	7.3E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	1.2E-03	mg/m^3	3.8E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	8.0E-03	mg/m^3	2.6E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.7E-09	mg/m^3	1.5E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	6.E-07
	2,3,7,8-TCDD TEQ	1.4E-09	mg/m^3	4.6E-12	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	2.E-07
	Bismuth-212	1.0E+00	pCi/g	--	--	7.81E+03	pCi/g	1.E-10
	Bismuth-214	1.7E+02	pCi/g	--	--	2.85E+01	pCi/g	6.E-06
	Cesium-137	9.4E-02	pCi/g	--	--	7.84E+03	pCi/g	1.E-11
	Lead-210	2.2E+02	pCi/g	--	--	2.86E+01	pCi/g	8.E-06
	Lead-212	8.2E-01	pCi/g	--	--	1.19E+03	pCi/g	7.E-10
	Lead-214	1.9E+02	pCi/g	--	--	2.85E+01	pCi/g	7.E-06
	Potassium-40	9.1E+00	pCi/g	--	--	3.97E+03	pCi/g	2.E-09
	Protactinium-234M	2.7E+00	pCi/g	--	--	7.29E+00	pCi/g	4.E-07
	Radium-226	3.5E+01	pCi/g	--	--	1.49E+01	pCi/g	2.E-06
	Radium-228	8.5E-01	pCi/g	--	--	4.69E+00	pCi/g	2.E-07
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	7.28E+00	pCi/g	1.E-07
	Uranium-235	1.2E-01	pCi/g	--	--	2.80E+00	pCi/g	4.E-08
Exposure Route Total								5.E-05
							Total of Receptor Risks Across All Media	1.E-03

Table 8.76
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		
				Value	Units	Value	Units	
Ingestion								
	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	7.0E-09	mg/kg-day	2.9E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	Chlorobenzene	3.4E+01	mg/kg	4.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	1.4E-06	mg/kg-day	5.4E-03	$(mg/kg\text{-}day)^{-1}$	7.6E-09
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.76a for Mutagenic Risks				6.E-07
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.76a for Mutagenic Risks				6.E-06
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.76a for Mutagenic Risks				4.E-07
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	7.1E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.76a for Mutagenic Risks				1.E-06
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.76a for Mutagenic Risks				3.E-07
	Dieldrin	2.3E-03	mg/kg	3.3E-09	mg/kg-day	1.6E+01	$(mg/kg\text{-}day)^{-1}$	5.E-08
	4,4'-DDT	3.5E-03	mg/kg	5.1E-09	mg/kg-day	3.4E-01	$(mg/kg\text{-}day)^{-1}$	2.E-09
	Heptachlor epoxide	9.1E-03	mg/kg	1.3E-08	mg/kg-day	9.1E+00	$(mg/kg\text{-}day)^{-1}$	1.E-07
	Aroclor 1248	8.7E+01	mg/kg	1.3E-04	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-04
	Aroclor 1254	5.8E+01	mg/kg	8.4E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-04
	Aroclor 1260	2.7E+01	mg/kg	3.9E-05	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	8.E-05
	High Risk PCB Congeners	7.3E+02	mg/kg	1.0E-03	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	2.E-03
	Aluminum	3.2E+04	mg/kg	4.7E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	3.9E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.2E-05	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Barium	3.4E+02	mg/kg	4.9E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	2.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	2.8E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	3.1E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.76a for Mutagenic Risks				2.E-05
	Cobalt	1.7E+02	mg/kg	2.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	7.0E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	5.4E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	1.1E-01	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	6.7E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	8.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	5.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	6.2E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	6.0E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	1.4E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	7.3E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	6.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	1.4E-09	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	1.8E-04
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	4.2E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	5.4E-05
	Bismuth-212	1.0E+00	pCi/g	--	--	5.3E+02	pCi/g	2.0E-09
	Bismuth-214	1.7E+02	pCi/g	--	--	1.8E-01	pCi/g	9.5E-04
	Cesium-137	9.4E-02	pCi/g	--	--	2.1E+01	pCi/g	4.5E-09
	Lead-210	2.2E+02	pCi/g	--	--	1.8E-01	pCi/g	1.2E-03
	Lead-212	8.2E-01	pCi/g	--	--	1.4E+01	pCi/g	5.9E-08
	Lead-214	1.9E+02	pCi/g	--	--	1.8E-01	pCi/g	1.0E-03
	Potassium-40	9.1E+00	pCi/g	--	--	1.5E+01	pCi/g	6.0E-07
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.5E-01	pCi/g	1.8E-05
	Radium-226	3.5E+01	pCi/g	--	--	1.6E-01	pCi/g	2.2E-04
	Radium-228	8.5E-01	pCi/g	--	--	3.3E-01	pCi/g	2.6E-06
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.5E-01	pCi/g	7.3E-06
	Uranium-235	1.2E-01	pCi/g	--	--	6.1E-01	pCi/g	1.9E-07
Ingestion Route Total								6.E-03

Table 8.76
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				Cancer Risk
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Value	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Units	
Dermal Absorption and External Exposure to Ionizing Radiation	1,2,4-Trichlorobenzene	4.9E-03	mg/kg	5.9E-10	mg/kg-day	2.9E-02	$(mg/kg-day)^{-1}$	1.7E-11
	Chlorobenzene	3.4E+01	mg/kg	4.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	1,4-Dichlorobenzene	9.7E-01	mg/kg	3.9E-07	mg/kg-day	5.4E-03	$(mg/kg-day)^{-1}$	2.1E-09
	Benzo(a)anthracene	9.4E-01	mg/kg	See Table 8.76a for Mutagenic Risks				2.E-07
	Benzo(a)pyrene	8.5E-01	mg/kg	See Table 8.76a for Mutagenic Risks				2.E-06
	Benzo(b)fluoranthene	6.3E-01	mg/kg	See Table 8.76a for Mutagenic Risks				1.E-07
	Bis(2-ethylhexyl)phthalate	4.9E+00	mg/kg	2.0E-06	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	3.E-08
	Dibenzo(a,h)anthracene	2.3E-01	mg/kg	See Table 8.76a for Mutagenic Risks				5.E-07
	Indeno(1,2,3-cd)pyrene	5.2E-01	mg/kg	See Table 8.76a for Mutagenic Risks				1.E-07
	Dieldrin	2.3E-03	mg/kg	9.2E-10	mg/kg-day	1.6E+01	$(mg/kg-day)^{-1}$	1.E-08
	4,4'-DDT	3.5E-03	mg/kg	4.3E-10	mg/kg-day	3.4E-01	$(mg/kg-day)^{-1}$	1.E-10
	Heptachlor epoxide	9.1E-03	mg/kg	3.7E-09	mg/kg-day	9.1E+00	$(mg/kg-day)^{-1}$	3.E-08
	Aroclor 1248	8.7E+01	mg/kg	4.9E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-04
	Aroclor 1254	5.8E+01	mg/kg	3.3E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	7.E-05
	Aroclor 1260	2.7E+01	mg/kg	1.6E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-05
	High Risk PCB Congeners	7.3E+02	mg/kg	4.1E-04	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	8.E-04
	Aluminum	3.2E+04	mg/kg	1.3E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	2.7E+01	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.7E-06	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	3.E-06
	Barium	3.4E+02	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Beryllium	1.8E+00	mg/kg	7.3E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	8.0E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	2.2E+03	mg/kg	8.8E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	4.9E+00	mg/kg	See Table 8.76a for Mutagenic Risks				2.E-05
	Cobalt	1.7E+02	mg/kg	6.9E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	4.9E+03	mg/kg	2.0E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cyanide	3.8E-01	mg/kg	1.5E-08	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	7.4E+04	mg/kg	3.0E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	4.6E+02	mg/kg	1.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	5.7E+02	mg/kg	2.3E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Selenium	3.6E+00	mg/kg	1.5E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	4.3E+00	mg/kg	1.8E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	4.2E+00	mg/kg	1.7E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	9.9E+01	mg/kg	4.0E-06	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	5.1E+03	mg/kg	2.1E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	4.6E+00	mg/kg	1.9E-07	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	9.7E-04	mg/kg	5.5E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	7.E-05
	2,3,7,8-TCDD TEQ	2.9E-04	mg/kg	3.5E-11	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	5.E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	1.8E-02	pCi/g	6.E-05
	Bismuth-214	1.7E+02	pCi/g	--	--	1.7E-02	pCi/g	1.E-02
	Cesium-137	9.4E-02	pCi/g	--	--	4.7E-02	pCi/g	2.E-06
	Lead-210	2.2E+02	pCi/g	--	--	2.7E+01	pCi/g	8.E-06
	Lead-212	8.2E-01	pCi/g	--	--	1.6E-02	pCi/g	5.E-05
	Lead-214	1.9E+02	pCi/g	--	--	1.5E-02	pCi/g	1.E-02
	Potassium-40	9.1E+00	pCi/g	--	--	1.6E-01	pCi/g	6.E-05
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.4E-02	pCi/g	2.E-04
	Radium-226	3.5E+01	pCi/g	--	--	1.5E-02	pCi/g	2.E-03
	Radium-228	8.5E-01	pCi/g	--	--	1.1E-02	pCi/g	8.E-05
	Thallium-208	2.7E-01	pCi/g	--	--	6.8E-03	pCi/g	4.E-05
	Thorium-234	1.1E+00	pCi/g	--	--	1.4E-02	pCi/g	7.E-05
	Uranium-235	1.2E-01	pCi/g	--	--	5.0E-02	pCi/g	2.E-06
Dermal Absorption Route Total								3.E-02

Table 8.76
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Combined Surface and Subsurface Soil
Exposure Medium: Site Soil
Exposure Point: Site Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer) Value	Intake (Cancer) Units	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Value	Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides) Units	Cancer Risk
Inhalation								
	1,2,4-Trichlorobenzene	2.1E-07	mg/m^3	7.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chlorobenzene	4.6E-03	mg/m^3	1.7E-03	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	1,4-Dichlorobenzene	8.1E-05	mg/m^3	2.9E-05	mg/m^3	1.1E-02	$(mg/m^3)^{-1}$	3.E-07
	Benzo(a)anthracene	2.0E-07	mg/m^3	See Table 8.76a for Mutagenic Risks				1.E-08
	Benzo(a)pyrene	6.2E-10	mg/m^3	See Table 8.76a for Mutagenic Risks				4.E-10
	Benzo(b)fluoranthene	4.6E-10	mg/m^3	See Table 8.76a for Mutagenic Risks				3.E-11
	Bis(2-ethylhexyl)phthalate	3.6E-09	mg/m^3	1.3E-09	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	3.E-12
	Dibenzo(a,h)anthracene	1.7E-10	mg/m^3	See Table 8.76a for Mutagenic Risks				1.E-10
	Indeno(1,2,3-cd)pyrene	3.8E-10	mg/m^3	See Table 8.76a for Mutagenic Risks				2.E-11
	Dieldrin	1.7E-12	mg/m^3	6.0E-13	mg/m^3	4.6E+00	$(mg/m^3)^{-1}$	3.E-12
	4,4'-DDT	2.6E-12	mg/m^3	9.2E-13	mg/m^3	9.7E-02	$(mg/m^3)^{-1}$	9.E-14
	Heptachlor epoxide	6.7E-12	mg/m^3	2.4E-12	mg/m^3	2.6E+00	$(mg/m^3)^{-1}$	6.E-12
	Aroclor 1248	1.3E-04	mg/m^3	4.6E-05	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-05
	Aroclor 1254	6.4E-05	mg/m^3	2.3E-05	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-05
	Aroclor 1260	1.9E-05	mg/m^3	6.9E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-06
	High Risk PCB Congeners	1.3E-03	mg/m^3	4.5E-04	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	3.E-04
	Aluminum	2.4E-05	mg/m^3	8.5E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.0E-08	mg/m^3	7.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.0E-08	mg/m^3	3.6E-09	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	2.E-08
	Barium	2.5E-07	mg/m^3	8.9E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Beryllium	1.3E-09	mg/m^3	4.7E-10	mg/m^3	2.4E+00	$(mg/m^3)^{-1}$	1.E-09
	Cadmium	1.4E-08	mg/m^3	5.1E-09	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	9.E-09
	Chromium (Total)	1.6E-06	mg/m^3	5.7E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	3.6E-09	mg/m^3	See Table 8.76a for Mutagenic Risks				3.E-07
	Cobalt	1.2E-07	mg/m^3	4.4E-08	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	4.E-07
	Copper	3.6E-06	mg/m^3	1.3E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cyanide	2.8E-10	mg/m^3	9.9E-11	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	5.4E-05	mg/m^3	1.9E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	3.4E-07	mg/m^3	1.2E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	4.2E-07	mg/m^3	1.5E-07	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	4.E-08
	Selenium	2.7E-09	mg/m^3	9.5E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Silver	3.2E-09	mg/m^3	1.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	3.1E-09	mg/m^3	1.1E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	7.3E-08	mg/m^3	2.6E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	3.7E-06	mg/m^3	1.3E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	4.9E-04	mg/m^3	1.7E-04	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	4.6E-10	mg/m^3	1.6E-10	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	6.E-06
	2,3,7,8-TCDD TEQ	1.4E-10	mg/m^3	4.9E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	2.E-06
	Bismuth-212	1.0E+00	pCi/g	--	--	3.9E+04	pCi/g	3.E-11
	Bismuth-214	1.7E+02	pCi/g	--	--	1.4E+02	pCi/g	1.E-06
	Cesium-137	9.4E-02	pCi/g	--	--	3.9E+04	pCi/g	2.E-12
	Lead-210	2.2E+02	pCi/g	--	--	1.4E+02	pCi/g	2.E-06
	Lead-212	8.2E-01	pCi/g	--	--	5.9E+03	pCi/g	1.E-10
	Lead-214	1.9E+02	pCi/g	--	--	1.4E+02	pCi/g	1.E-06
	Potassium-40	9.1E+00	pCi/g	--	--	2.0E+04	pCi/g	5.E-10
	Protactinium-234M	2.7E+00	pCi/g	--	--	3.6E+01	pCi/g	8.E-08
	Radium-226	3.5E+01	pCi/g	--	--	7.4E+01	pCi/g	5.E-07
	Radium-228	8.5E-01	pCi/g	--	--	2.3E+01	pCi/g	4.E-08
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	3.6E+01	pCi/g	3.E-08
	Uranium-235	1.2E-01	pCi/g	--	--	1.4E+01	pCi/g	8.E-09
Inhalation Route Total								3.E-04
							Total of Receptor Risks Across All Media	3.E-02

Table 8.76a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									6.E-07
	Age 0 -2 years	9.4E-01	mg/kg	3.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	3.E-07	
	Age 2 - 6 years	9.4E-01	mg/kg	6.9E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-07	
	Age 6 - 16 years	9.4E-01	mg/kg	1.6E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 26 years	9.4E-01	mg/kg	1.6E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-08	
	Dermal Absorption									2.E-07
	Age 0 -2 years	9.4E-01	mg/kg	1.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	9.4E-01	mg/kg	2.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.E-08	
	Age 6 - 16 years	9.4E-01	mg/kg	8.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Age 16 - 26 years	9.4E-01	mg/kg	8.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	9.E-09	
	Inhalation									1.E-08
	Age 0 -2 years	2.0E-07	mg/m3	5.4E-09	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	3.E-09	
	Age 2 - 6 years	2.0E-07	mg/m3	1.1E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-09	
	Age 6 - 16 years	2.0E-07	mg/m3	2.7E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	5.E-09	
	Age 16 -26 years	2.0E-07	mg/m3	2.7E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	2.E-09	
Benzo(a)pyrene	Ingestion									6.E-06
	Age 0 -2 years	8.5E-01	mg/kg	3.1E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	3.E-06	
	Age 2 - 6 years	8.5E-01	mg/kg	6.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-06	
	Age 6 - 16 years	8.5E-01	mg/kg	1.5E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	4.E-07	
	Age 16 - 26 years	8.5E-01	mg/kg	1.5E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	1.E-07	
	Dermal Absorption									2.E-06
	Age 0 -2 years	8.5E-01	mg/kg	9.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	1.E-06	
	Age 2 - 6 years	8.5E-01	mg/kg	1.9E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	6.E-07	
	Age 6 - 16 years	8.5E-01	mg/kg	8.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Age 16 - 26 years	8.5E-01	mg/kg	8.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	8.E-08	
	Inhalation									4.E-10
	Age 0 -2 years	6.2E-10	mg/m3	1.7E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	1.E-10	
	Age 2 - 6 years	6.2E-10	mg/m3	3.4E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	6.E-11	
	Age 6 - 16 years	6.2E-10	mg/m3	8.5E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	2.E-10	
	Age 16 - 26 years	6.2E-10	mg/m3	8.5E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	5.E-11	

Table 8.76a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion									4.E-07
	Age 0 -2 years	6.3E-01	mg/kg	2.3E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	6.3E-01	mg/kg	4.6E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 6 - 16 years	6.3E-01	mg/kg	1.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Age 16 - 26 years	6.3E-01	mg/kg	1.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-08	
	Dermal Absorption									1.E-07
	Age 0 -2 years	6.3E-01	mg/kg	7.1E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	7.E-08	
	Age 2 - 6 years	6.3E-01	mg/kg	1.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-08	
	Age 6 - 16 years	6.3E-01	mg/kg	5.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	2.E-08	
	Age 16 - 26 years	6.3E-01	mg/kg	5.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	6.E-09	
	Inhalation									3.E-11
	Age 0 -2 years	4.6E-10	mg/m3	1.3E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	8.E-12	
	Age 2 - 6 years	4.6E-10	mg/m3	2.5E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	5.E-12	
	Age 6 - 16 years	4.6E-10	mg/m3	6.3E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-11	
	Age 16 - 26 years	4.6E-10	mg/m3	6.3E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	4.E-12	
Dibenzo(a.h)anthracene	Ingestion									1.E-06
	Age 0 -2 years	2.3E-01	mg/kg	8.3E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	8.E-07	
	Age 2 - 6 years	2.3E-01	mg/kg	1.7E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.E-07	
	Age 6 - 16 years	2.3E-01	mg/kg	3.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-07	
	Age 16 - 26 years	2.3E-01	mg/kg	3.9E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	4.E-08	
	Dermal Absorption									5.E-07
	Age 0 -2 years	2.3E-01	mg/kg	2.6E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	3.E-07	
	Age 2 - 6 years	2.3E-01	mg/kg	5.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	2.E-07	
	Age 6 - 16 years	2.3E-01	mg/kg	2.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	6.E-08	
	Age 16 - 26 years	2.3E-01	mg/kg	2.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.E-08	
	Inhalation									1.E-10
	Age 0 -2 years	1.7E-10	mg/m3	4.6E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	3.E-11	
	Age 2 - 6 years	1.7E-10	mg/m3	9.2E-12	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	2.E-11	
	Age 6 - 16 years	1.7E-10	mg/m3	2.3E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	4.E-11	
	Age 16 - 26 years	1.7E-10	mg/m3	2.3E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	1.E-11	

Table 8.76a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Indeno(1,2,3-c,d)pyrene	Ingestion									3.E-07
	Age 0 -2 years	5.2E-01	mg/kg	1.9E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	5.2E-01	mg/kg	3.8E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 6 - 16 years	5.2E-01	mg/kg	8.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Age 16 - 26 years	5.2E-01	mg/kg	8.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	9.E-09	
	Dermal Absorption									1.E-07
	Age 0 -2 years	5.2E-01	mg/kg	5.8E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	6.E-08	
	Age 2 - 6 years	5.2E-01	mg/kg	1.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-08	
	Age 6 - 16 years	5.2E-01	mg/kg	4.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-08	
	Age 16 - 26 years	5.2E-01	mg/kg	4.9E-08	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	5.E-09	
	Inhalation									2.E-11
	Age 0 -2 years	3.8E-10	mg/m3	1.0E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	6.E-12	
	Age 2 - 6 years	3.8E-10	mg/m3	2.1E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	4.E-12	
	Age 6 - 16 years	3.8E-10	mg/m3	5.2E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	9.E-12	
	Age 16 - 26 years	3.8E-10	mg/m3	5.2E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	3.E-12	
Chromium	Ingestion									2.E-05
	Age 0 -2 years	4.9E+00	mg/kg	1.8E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	9.E-06	
	Age 2 - 6 years	4.9E+00	mg/kg	3.6E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.E-06	
	Age 6 - 16 years	4.9E+00	mg/kg	8.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	1.E-06	
	Age 16 - 26 years	4.9E+00	mg/kg	8.5E-07	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	4.E-07	
	Dermal Absorption									2.E-05
	Age 0 -2 years	4.9E+00	mg/kg	4.3E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	9.E-06	
	Age 2 - 6 years	4.9E+00	mg/kg	8.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	5.E-06	
	Age 6 - 16 years	4.9E+00	mg/kg	3.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-06	
	Age 16 - 26 years	4.9E+00	mg/kg	3.6E-08	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	7.E-07	
	Inhalation									3.E-07
	Age 0 -2 years	3.6E-09	mg/m3	1.0E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	10	8.E-08	
	Age 2 - 6 years	3.6E-09	mg/m3	2.0E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	5.E-08	
	Age 6 - 16 years	3.6E-09	mg/m3	5.0E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	1.E-07	
	Age 16 - 26 years	3.6E-09	mg/m3	5.0E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	1	4.E-08	

Table 8.77
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.77a for Mutagenic Risks				1.E-06
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.77a for Mutagenic Risks				1.E-05
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.77a for Mutagenic Risks				1.E-06
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	2.0E-05	mg/kg-day	1.4E-02	$(mg/kg-day)^{-1}$	3.E-07
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.77a for Mutagenic Risks				3.E-06
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.77a for Mutagenic Risks				8.E-07
	Aroclor 1248	4.7E+00	mg/kg	6.7E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	1.E-05
	Aroclor 1254	2.4E+00	mg/kg	3.5E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	7.E-06
	Aroclor 1260	6.2E+00	mg/kg	8.9E-06	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	2.E-05
	High Risk PCB Congeners	1.2E+01	mg/kg	1.7E-05	mg/kg-day	2.0E+00	$(mg/kg-day)^{-1}$	3.E-05
	Aluminum	9.6E+04	mg/kg	1.4E-01	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	5.0E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	1.3E-05	mg/kg-day	1.5E+00	$(mg/kg-day)^{-1}$	2.E-05
	Barium	4.3E+02	mg/kg	6.2E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	2.9E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	5.2E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.77a for Mutagenic Risks				6.E-05
	Cobalt	1.6E+02	mg/kg	2.3E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	9.4E-03	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	2.4E-01	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	9.7E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	5.2E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	1.5E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	3.7E-04	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	1.1E-02	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	1.1E-05	mg/kg-day	NV	$(mg/kg-day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	3.4E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	4.4E-05
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	7.4E-10	mg/kg-day	1.3E+05	$(mg/kg-day)^{-1}$	9.6E-05
	Bismuth-212	1.1E+00	pCi/g	--	--	5.3E+02	pCi/g	2.0E-09
	Bismuth-214	2.1E+02	pCi/g	--	--	1.8E-01	pCi/g	1.2E-03
	Cesium-137	1.0E-01	pCi/g	--	--	2.1E+01	pCi/g	5.0E-09
	Lead-210	3.9E+02	pCi/g	--	--	1.8E-01	pCi/g	2.2E-03
	Lead-212	8.1E-01	pCi/g	--	--	1.4E+01	pCi/g	5.9E-08
	Lead-214	2.3E+02	pCi/g	--	--	1.8E-01	pCi/g	1.3E-03
	Potassium-40	9.4E+00	pCi/g	--	--	1.5E+01	pCi/g	6.2E-07
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.5E-01	pCi/g	1.8E-05
	Radium-226	2.3E+00	pCi/g	--	--	1.6E-01	pCi/g	1.4E-05
	Radium-228	8.8E-01	pCi/g	--	--	3.3E-01	pCi/g	2.7E-06
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	1.5E-01	pCi/g	7.6E-06
	Uranium-235	2.1E-01	pCi/g	--	--	6.1E-01	pCi/g	3.5E-07
Ingestion Route Total								5.E-03

Table 8.77
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Dermal Absorption and External Exposure to Ionizing Radiation								
	Benzo(a)anthracene	1.9E+00	mg/kg	See Table 8.77a for Mutagenic Risks				4.E-07
	Benzo(a)pyrene	1.7E+00	mg/kg	See Table 8.77a for Mutagenic Risks				4.E-06
	Benzo(b)fluoranthene	2.2E+00	mg/kg	See Table 8.77a for Mutagenic Risks				5.E-07
	Bis(2-ethylhexyl)phthalate	1.4E+01	mg/kg	5.7E-06	mg/kg-day	1.4E-02	$(mg/kg\text{-}day)^{-1}$	8.E-08
	Dibenzo(a,h)anthracene	5.3E-01	mg/kg	See Table 8.77a for Mutagenic Risks				1.E-06
	Indeno(1,2,3-cd)pyrene	1.2E+00	mg/kg	See Table 8.77a for Mutagenic Risks				3.E-07
	Aroclor 1248	4.7E+00	mg/kg	2.6E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	5.E-06
	Aroclor 1254	2.4E+00	mg/kg	1.4E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Aroclor 1260	6.2E+00	mg/kg	3.5E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	7.E-06
	High Risk PCB Congeners	1.2E+01	mg/kg	6.7E-06	mg/kg-day	2.0E+00	$(mg/kg\text{-}day)^{-1}$	1.E-05
	Aluminum	9.6E+04	mg/kg	3.9E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Antimony	3.5E+01	mg/kg	1.4E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.5E+01	mg/kg	1.8E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Barium	4.3E+02	mg/kg	1.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Cadmium	2.0E+01	mg/kg	8.1E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Total)	3.6E+02	mg/kg	1.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Chromium (Hexavalent)	1.8E+01	mg/kg	See Table 8.77a for Mutagenic Risks				6.E-05
	Cobalt	1.6E+02	mg/kg	6.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Copper	6.5E+03	mg/kg	2.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	1.6E+05	mg/kg	6.7E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	6.8E+02	mg/kg	2.7E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Nickel	3.6E+02	mg/kg	1.4E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Silver	9.7E+00	mg/kg	3.9E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.0E+01	mg/kg	4.2E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	2.6E+02	mg/kg	1.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Zinc	7.7E+03	mg/kg	3.1E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	7.7E+00	mg/kg	3.1E-07	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Dioxin-like PCBs	2.4E-04	mg/kg	1.3E-10	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	2.E-05
	2,3,7,8-TCDD TEQ	5.1E-04	mg/kg	6.2E-11	mg/kg-day	1.3E+05	$(mg/kg\text{-}day)^{-1}$	8.E-06
	Bismuth-212	1.1E+00	pCi/g	--	--	1.8E-02	pCi/g	6.E-05
	Bismuth-214	2.1E+02	pCi/g	--	--	1.7E-02	pCi/g	1.E-02
	Cesium-137	1.0E-01	pCi/g	--	--	4.7E-02	pCi/g	2.E-06
	Lead-210	3.9E+02	pCi/g	--	--	2.7E+01	pCi/g	1.E-05
	Lead-212	8.1E-01	pCi/g	--	--	1.6E-02	pCi/g	5.E-05
	Lead-214	2.3E+02	pCi/g	--	--	1.5E-02	pCi/g	2.E-02
	Potassium-40	9.4E+00	pCi/g	--	--	1.6E-01	pCi/g	6.E-05
	Protactinium-234M	2.7E+00	pCi/g	--	--	1.4E-02	pCi/g	2.E-04
	Radium-226	2.3E+00	pCi/g	--	--	1.5E-02	pCi/g	2.E-04
	Radium-228	8.8E-01	pCi/g	--	--	1.1E-02	pCi/g	8.E-05
	Thallium-208	2.7E-01	pCi/g	--	--	6.8E-03	pCi/g	4.E-05
	Thorium-234	1.1E+00	pCi/g	--	--	1.4E-02	pCi/g	8.E-05
	Uranium-235	2.1E-01	pCi/g	--	--	5.0E-02	pCi/g	4.E-06
Dermal Absorption Route Total								3.E-02

Table 8.77
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Medium: Current Surface Soil Only
Exposure Medium: Current Surface Soil
Exposure Point: Current Surface Soil
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk (chemical COPCs) Screening value (radionuclides)		Cancer Risk
				Value	Units	Value	Units	
Inhalation								
	Benzo(a)anthracene	4.0E-07	mg/m^3	See Table 8.77a for Mutagenic Risks				2.E-08
	Benzo(a)pyrene	1.3E-09	mg/m^3	See Table 8.77a for Mutagenic Risks				8.E-10
	Benzo(b)fluoranthene	1.6E-09	mg/m^3	See Table 8.77a for Mutagenic Risks				9.E-11
	Bis(2-ethylhexyl)phthalate	1.0E-08	mg/m^3	3.7E-09	mg/m^3	2.4E-03	$(mg/m^3)^{-1}$	9.E-12
	Dibenzo(a,h)anthracene	3.9E-10	mg/m^3	See Table 8.77a for Mutagenic Risks				2.E-10
	Indeno(1,2,3-cd)pyrene	8.6E-10	mg/m^3	See Table 8.77a for Mutagenic Risks				5.E-11
	Aroclor 1248	6.9E-06	mg/m^3	2.5E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	1.E-06
	Aroclor 1254	2.6E-06	mg/m^3	9.4E-07	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	5.E-07
	Aroclor 1260	4.4E-06	mg/m^3	1.6E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	9.E-07
	High Risk PCB Congeners	2.1E-05	mg/m^3	7.3E-06	mg/m^3	5.7E-01	$(mg/m^3)^{-1}$	4.E-06
	Aluminum	7.1E-05	mg/m^3	2.5E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Antimony	2.5E-08	mg/m^3	9.0E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.1E-08	mg/m^3	3.8E-09	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	2.E-08
	Barium	3.2E-07	mg/m^3	1.1E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Cadmium	1.5E-08	mg/m^3	5.3E-09	mg/m^3	1.8E+00	$(mg/m^3)^{-1}$	9.E-09
	Chromium (Total)	2.6E-07	mg/m^3	9.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Chromium (Hexavalent)	1.3E-08	mg/m^3	See Table 8.77a for Mutagenic Risks				1.E-06
	Cobalt	1.2E-07	mg/m^3	4.3E-08	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	4.E-07
	Copper	4.8E-06	mg/m^3	1.7E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Iron	1.2E-04	mg/m^3	4.3E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	5.0E-07	mg/m^3	1.8E-07	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Nickel	2.6E-07	mg/m^3	9.4E-08	mg/m^3	2.4E-01	$(mg/m^3)^{-1}$	2.E-08
	Silver	7.2E-09	mg/m^3	2.6E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	7.6E-09	mg/m^3	2.7E-09	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	1.9E-07	mg/m^3	6.7E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Zinc	5.7E-06	mg/m^3	2.0E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	8.2E-04	mg/m^3	2.9E-04	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Dioxin-like PCBs	1.1E-10	mg/m^3	4.0E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	2.E-06
	2,3,7,8-TCDD TEQ	2.4E-10	mg/m^3	8.6E-11	mg/m^3	3.8E+04	$(mg/m^3)^{-1}$	3.E-06
	Bismuth-212	1.1E+00	pCi/g	--	--	3.9E+04	pCi/g	3.E-11
	Bismuth-214	2.1E+02	pCi/g	--	--	1.4E+02	pCi/g	1.E-06
	Cesium-137	1.0E-01	pCi/g	--	--	3.9E+04	pCi/g	3.E-12
	Lead-210	3.9E+02	pCi/g	--	--	1.4E+02	pCi/g	3.E-06
	Lead-212	8.1E-01	pCi/g	--	--	5.9E+03	pCi/g	1.E-10
	Lead-214	2.3E+02	pCi/g	--	--	1.4E+02	pCi/g	2.E-06
	Potassium-40	9.4E+00	pCi/g	--	--	2.0E+04	pCi/g	5.E-10
	Protactinium-234M	2.7E+00	pCi/g	--	--	3.6E+01	pCi/g	8.E-08
	Radium-226	2.3E+00	pCi/g	--	--	7.4E+01	pCi/g	3.E-08
	Radium-228	8.8E-01	pCi/g	--	--	2.3E+01	pCi/g	4.E-08
	Thallium-208	2.7E-01	pCi/g	--	--	NV	pCi/g	NV
	Thorium-234	1.1E+00	pCi/g	--	--	3.6E+01	pCi/g	3.E-08
	Uranium-235	2.1E-01	pCi/g	--	--	1.4E+01	pCi/g	2.E-08
Inhalation Route Total								2.E-05
							Total of Receptor Risks Across All Media	3.E-02

Table 8.77a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(a)anthracene	Ingestion									1.E-06
	Age 0 -2 years	1.9E+00	mg/kg	6.9E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	7.E-07	
	Age 2 - 6 years	1.9E+00	mg/kg	1.4E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	4.E-07	
	Age 6 - 16 years	1.9E+00	mg/kg	3.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 16 - 26 years	1.9E+00	mg/kg	3.2E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	3.E-08	
	Dermal Absorption									4.E-07
	Age 0 -2 years	1.9E+00	mg/kg	2.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	1.9E+00	mg/kg	4.3E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 6 - 16 years	1.9E+00	mg/kg	1.8E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-08	
	Age 16 - 26 years	1.9E+00	mg/kg	1.8E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-08	
	Inhalation									2.E-08
	Age 0 -2 years	4.0E-07	mg/m3	1.1E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	7.E-09	
	Age 2 - 6 years	4.0E-07	mg/m3	2.2E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	4.E-09	
	Age 6 - 16 years	4.0E-07	mg/m3	5.5E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	1.E-08	
	Age 16 - 26 years	4.0E-07	mg/m3	5.5E-08	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	3.E-09	
Benzo(a)pyrene	Ingestion									1.E-05
	Age 0 -2 years	1.7E+00	mg/kg	6.3E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	6.E-06	
	Age 2 - 6 years	1.7E+00	mg/kg	1.3E-06	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	4.E-06	
	Age 6 - 16 years	1.7E+00	mg/kg	3.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	9.E-07	
	Age 16 - 26 years	1.7E+00	mg/kg	3.0E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	3.E-07	
	Dermal Absorption									4.E-06
	Age 0 -2 years	1.7E+00	mg/kg	1.9E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.E-06	
	Age 2 - 6 years	1.7E+00	mg/kg	3.9E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-06	
	Age 6 - 16 years	1.7E+00	mg/kg	1.6E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	5.E-07	
	Age 16 - 26 years	1.7E+00	mg/kg	1.6E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	2.E-07	
	Inhalation									8.E-10
	Age 0 -2 years	1.3E-09	mg/m3	3.5E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	2.E-10	
	Age 2 - 6 years	1.3E-09	mg/m3	7.0E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	1.E-10	
	Age 6 - 16 years	1.3E-09	mg/m3	1.7E-10	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	3.E-10	
	Age 16 - 26 years	1.3E-09	mg/m3	1.7E-10	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	1.E-10	

Table 8.77a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Benzo(b)fluoranthene	Ingestion									1.E-06
	Age 0 -2 years	2.2E+00	mg/kg	7.9E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	8.E-07	
	Age 2 - 6 years	2.2E+00	mg/kg	1.6E-06	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	5.E-07	
	Age 6 - 16 years	2.2E+00	mg/kg	3.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 16 - 26 years	2.2E+00	mg/kg	3.7E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	4.E-08	
	Dermal Absorption									5.E-07
	Age 0 -2 years	2.2E+00	mg/kg	2.4E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	2.E-07	
	Age 2 - 6 years	2.2E+00	mg/kg	4.9E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	1.E-07	
	Age 6 - 16 years	2.2E+00	mg/kg	2.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.E-08	
	Age 16 - 26 years	2.2E+00	mg/kg	2.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-08	
	Inhalation									9.E-11
	Age 0 -2 years	1.6E-09	mg/m3	4.4E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	3.E-11	
	Age 2 - 6 years	1.6E-09	mg/m3	8.7E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-11	
	Age 6 - 16 years	1.6E-09	mg/m3	2.2E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	4.E-11	
	Age 16 - 26 years	1.6E-09	mg/m3	2.2E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	1.E-11	
Dibenzo(a.h)anthracene	Ingestion									3.E-06
	Age 0 -2 years	5.3E-01	mg/kg	1.9E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	2.E-06	
	Age 2 - 6 years	5.3E-01	mg/kg	3.9E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-06	
	Age 6 - 16 years	5.3E-01	mg/kg	9.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	3.E-07	
	Age 16 - 26 years	5.3E-01	mg/kg	9.1E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	9.E-08	
	Dermal Absorption									1.E-06
	Age 0 -2 years	5.3E-01	mg/kg	6.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	10	6.E-07	
	Age 2 - 6 years	5.3E-01	mg/kg	1.2E-07	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	4.E-07	
	Age 6 - 16 years	5.3E-01	mg/kg	5.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	3	1.E-07	
	Age 16 - 26 years	5.3E-01	mg/kg	5.0E-08	mg/kg-day	1.0E+00	(mg/kg-day)-1	1	5.E-08	
	Inhalation									2.E-10
	Age 0 -2 years	3.9E-10	mg/m3	1.1E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	10	6.E-11	
	Age 2 - 6 years	3.9E-10	mg/m3	2.1E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	4.E-11	
	Age 6 - 16 years	3.9E-10	mg/m3	5.3E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	3	1.E-10	
	Age 16 - 26 years	3.9E-10	mg/m3	5.3E-11	mg/m3	6.0E-01	$(mg/m^3)^{-1}$	1	3.E-11	

Table 8.77a
CALCULATION OF CANCER RISKS - AGE-DEPENDENT CALCULATIONS
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult Age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations						
		Value	Units	Intake (Cancer)		Cancer Slope Factor		Age-Dependent Adjustment Factors (unitless)	Age-Dependent Cancer Risk	Cancer Risk
				Value	Units	Value	Units			
Indeno(1,2,3-c,d)pyrene	Ingestion									8.E-07
	Age 0 -2 years	1.2E+00	mg/kg	4.3E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	4.E-07	
	Age 2 - 6 years	1.2E+00	mg/kg	8.6E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-07	
	Age 6 - 16 years	1.2E+00	mg/kg	2.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	6.E-08	
	Age 16 - 26 years	1.2E+00	mg/kg	2.0E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	2.E-08	
	Dermal Absorption									3.E-07
	Age 0 -2 years	1.2E+00	mg/kg	1.3E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	10	1.E-07	
	Age 2 - 6 years	1.2E+00	mg/kg	2.6E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	8.E-08	
	Age 6 - 16 years	1.2E+00	mg/kg	1.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	3	3.E-08	
	Age 16 - 26 years	1.2E+00	mg/kg	1.1E-07	mg/kg-day	1.0E-01	(mg/kg-day)-1	1	1.E-08	
	Inhalation									5.E-11
	Age 0 -2 years	8.6E-10	mg/m3	2.4E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	10	1.E-11	
	Age 2 - 6 years	8.6E-10	mg/m3	4.7E-11	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	9.E-12	
	Age 6 - 16 years	8.6E-10	mg/m3	1.2E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	3	2.E-11	
	Age 16 - 30 years	8.6E-10	mg/m3	1.2E-10	mg/m3	6.0E-02	$(mg/m^3)^{-1}$	1	7.E-12	
Chromium	Ingestion									6.E-05
	Age 0 -2 years	1.8E+01	mg/kg	6.4E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	10	3.E-05	
	Age 2 - 6 years	1.8E+01	mg/kg	1.3E-05	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	2.E-05	
	Age 6 - 16 years	1.8E+01	mg/kg	3.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	3	5.E-06	
	Age 16 - 26 years	1.8E+01	mg/kg	3.0E-06	mg/kg-day	5.0E-01	(mg/kg-day)-1	1	2.E-06	
	Dermal Absorption									6.E-05
	Age 0 -2 years	1.8E+01	mg/kg	1.5E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	10	3.E-05	
	Age 2 - 6 years	1.8E+01	mg/kg	3.1E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	2.E-05	
	Age 6 - 16 years	1.8E+01	mg/kg	1.3E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	3	8.E-06	
	Age 16 - 26 years	1.8E+01	mg/kg	1.3E-07	mg/kg-day	2.0E+01	(mg/kg-day)-1	1	3.E-06	
	Inhalation									1.E-06
	Age 0 -2 years	1.3E-08	mg/m3	3.6E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	10	3.E-07	
	Age 2 - 6 years	1.3E-08	mg/m3	7.1E-10	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	2.E-07	
	Age 6 - 16 years	1.3E-08	mg/m3	1.8E-09	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	3	4.E-07	
	Age 16 - 26 years	1.3E-08	mg/m3	1.8E-09	mg/m3	8.4E+01	$(mg/m^3)^{-1}$	1	1.E-07	

Table 8.78
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Medium: Cradock Community Sediment
Exposure Medium: Sediment
Exposure Point: Cradock Community Sediment
Receptor Population: Resident
Receptor Age: Child/Adult, age-adjusted

Exposure Route	Chemical of Potential Concern	Exposure Point Concentration		Cancer Risk Calculations				
		Value	Units	Intake (Cancer)		Cancer Slope Factor or Inhalation Unit Risk		Cancer Risk
				Value	Units	Value	Units	
Ingestion								
	Aluminum	2.0E+04	mg/kg	2.9E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.2E-05	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	2.E-05
	Cobalt	8.8E+01	mg/kg	1.3E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	4.1E+04	mg/kg	6.0E-02	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	2.5E+02	mg/kg	3.6E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.8E+00	mg/kg	2.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	5.2E+01	mg/kg	7.5E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	7.4E-01	mg/kg	1.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Bismuth-212	1.3E+00	pCi/g	--	--	5.3E+02	pCi/g	2.E-09
	Bismuth-214	6.2E-01	pCi/g	--	--	1.8E-01	pCi/g	3.E-06
	Lead-212	1.1E+00	pCi/g	--	--	1.4E+01	pCi/g	8.E-08
	Lead-214	7.2E-01	pCi/g	--	--	1.8E-01	pCi/g	4.E-06
	Potassium-40	1.7E+01	pCi/g	--	--	1.5E+01	pCi/g	1.E-06
	Radium-228	1.2E+00	pCi/g	--	--	3.3E-01	pCi/g	4.E-06
	Thallium-208	3.5E-01	pCi/g	--	--	NV	pCi/g	NV
Ingestion Route Total								3.E-05
Dermal Absorption and External Exposure to Ionizing Radiation								
	Aluminum	2.0E+04	mg/kg	8.2E-04	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Arsenic	1.4E+01	mg/kg	1.7E-06	mg/kg-day	1.5E+00	$(mg/kg\text{-}day)^{-1}$	3.E-06
	Cobalt	8.8E+01	mg/kg	3.6E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Iron	4.1E+04	mg/kg	1.7E-03	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Manganese	2.5E+02	mg/kg	1.0E-05	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Thallium	1.8E+00	mg/kg	7.4E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Vanadium	5.2E+01	mg/kg	2.1E-06	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Mercury	7.4E-01	mg/kg	3.0E-08	mg/kg-day	NV	$(mg/kg\text{-}day)^{-1}$	NV
	Bismuth-212	1.3E+00	pCi/g	--	--	1.8E-02	pCi/g	7.E-05
	Bismuth-214	6.2E-01	pCi/g	--	--	1.7E-02	pCi/g	4.E-05
	Lead-212	1.1E+00	pCi/g	--	--	1.6E-02	pCi/g	7.E-05
	Lead-214	7.2E-01	pCi/g	--	--	1.5E-02	pCi/g	5.E-05
	Potassium-40	1.7E+01	pCi/g	--	--	1.6E-01	pCi/g	1.E-04
	Radium-228	1.2E+00	pCi/g	--	--	1.1E-02	pCi/g	1.E-04
	Thallium-208	3.5E-01	pCi/g	--	--	6.8E-03	pCi/g	5.E-05
Dermal Absorption Route Total								5.E-04
Inhalation								
	Aluminum	1.5E-05	mg/m^3	5.3E-06	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Arsenic	1.1E-08	mg/m^3	3.8E-09	mg/m^3	4.3E+00	$(mg/m^3)^{-1}$	2.E-08
	Cobalt	6.5E-08	mg/m^3	2.3E-08	mg/m^3	9.0E+00	$(mg/m^3)^{-1}$	2.E-07
	Iron	3.0E-05	mg/m^3	1.1E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Manganese	1.9E-07	mg/m^3	6.6E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Thallium	1.3E-09	mg/m^3	4.8E-10	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Vanadium	3.8E-08	mg/m^3	1.4E-08	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Mercury	7.9E-05	mg/m^3	2.8E-05	mg/m^3	NV	$(mg/m^3)^{-1}$	NV
	Bismuth-212	9.5E-10	pCi/g	--	--	3.9E+04	pCi/g	2.E-20
	Bismuth-214	4.5E-10	pCi/g	--	--	1.4E+02	pCi/g	3.E-18
	Lead-212	7.9E-10	pCi/g	--	--	5.9E+03	pCi/g	1.E-19
	Lead-214	5.3E-10	pCi/g	--	--	1.4E+02	pCi/g	4.E-18
	Potassium-40	1.2E-08	pCi/g	--	--	2.0E+04	pCi/g	6.E-19
	Radium-228	8.9E-10	pCi/g	--	--	2.3E+01	pCi/g	4.E-17
	Thallium-208	2.6E-10	pCi/g	--	--	NV	pCi/g	NV
Inhalation Route Total								2.E-07
							Total of Receptor Hazards Across All Media	5.E-04

TABLE 9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil											
			Benzo(a)anthracene	2.E-07	- -	6.E-08	2.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological	0.01	- -	0.004	0.02
			Benzo(b)fluoranthene	2.E-07	- -	7.E-08	3.E-07	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-08	- -	9.E-09	5.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.002	- -	0.0004	0.002
			Dibenzo(a,h)anthracene	5.E-07	- -	2.E-07	7.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-07	- -	4.E-08	2.E-07	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	9.E-07	- -	3.E-07	1.E-06	Aroclor 1254	Eyes, Nails, Immune System	0.3	- -	0.09	0.4
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.2	- -	0.005	0.2
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.2	- -	0.03	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular	0.06	- -	0.008	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.006
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.001	0.001
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.009	0.4
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.5	- -	0.01	0.5
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.04	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.04	- -	0.02	0.06
			Silver	NV	- -	NV	NV	Silver	Skin	0.004	- -	0.003	0.007
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.06	- -	0.001	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.06	- -	0.019	0.07
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0.2	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0.1	2
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	1.E-06	- -	4.E-06	5.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	5.E-07	- -	2.E-06	2.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	8.E-08	1.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	8	- -	0.8	9
	Exposure Medium Total						9.E-04						9

TABLE 9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	3.E-10	- -	3.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	1.E-11	- -	1.E-11	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	1.E-12	- -	1.E-12	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	6.E-14	- -	6.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	3.E-12	- -	3.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	6.E-13	- -	6.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	9.E-09	- -	9.E-09	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	4.E-09	- -	4.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	6.E-09	- -	6.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-08	- -	3.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	1.E-10	- -	1.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	5.E-14	- -	5.E-14	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	3.E-09	- -	3.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	5.E-15	- -	5.E-15	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	5.E-09	- -	5.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	3.E-13	- -	3.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	9.E-13	- -	9.E-13	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-10	- -	1.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	6.E-11	- -	6.E-11	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	7.E-11	- -	7.E-11	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	6.E-11	- -	6.E-11	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	3.E-11	- -	3.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	1.E-07	--	1.E-07	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						1.E-07						0.08
Soil Total							9.E-04						9

TABLE 9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	6.E-08	- -	6.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	6.E-08	--	6.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						6.E-08						0.009
Groundwater Total							6.E-08						0.009
Sediment	Northern Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	9.E-07	- -	4.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.003	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	6.E-08	- -	2.E-07	2.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-08	- -	2.E-07	2.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		0.7	--	0.06	0.7
	Exposure Medium Total						2.E-05						0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	8.E-07	- -	1.E-07	9.E-07	Arsenic	Skin, Vascular	0.02	- -	0.004	0.02
			Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	3.E-11	- -	2.E-07	2.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	8.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	9.E-10	- -	2.E-07	2.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	9.E-08	- -	3.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	8.E-09	- -	2.E-07	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	5.E-07	7.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	3.E-07	3.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-07	1.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-08	- -	2.E-07	3.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	6.E-06	1.E-05	Chemical Total		0.02	--	0.009	0.03
	Exposure Medium Total						1.E-05						0.03
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	6.E-07	- -	1.E-07	7.E-07	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.003	0.1
			Dioxin-like PCBs	6.E-07	- -	3.E-07	9.E-07	Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	4.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	1.E-10	- -	2.E-08	2.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	5.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.6	--	0.1	0.7
	Exposure Medium Total						1.E-04						0.7

TABLE 9.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	1.E-07	- -	6.E-08	2.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	2.E-07	- -	8.E-08	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0006	0.02
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	4.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	1.E-07	- -	3.E-07	4.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	4.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		9	--	0.5	9
	Exposure Medium Total						2.E-05						9
Sediment Total							2.E-04						11
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.0016	- -	0.006	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Radium-226	1.E-06	- -	1.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.1	--	1	1
	Exposure Medium Total						1.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.00687	- -	0.0003	0.007
			Chromium (Hexavalent)	2.E-07	- -	8.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	1.E-10	- -	7.E-09	8.E-09	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	3.E-07	3.E-07	2,3,7,8-TCDD TEQ	Development	0.0004	- -	0.04	0.04
			Potassium-40	5.E-08	- -	7.E-12	5.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	5.E-07	--	1.E-06	2.E-06	Chemical Total		0.1	--	0.05	0.2
	Exposure Medium Total						2.E-06						0.2

TABLE 9.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.00034	0.007
			Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.00395	0.09
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.002	- -	0.0001	0.002
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	1.E-08	- -	8.E-07	8.E-07	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.4	--	0.8	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							8.E-05						2

Total Risk Across All Media	1.E-03
Total Hazard Index Across All Media	22

Total Neurological HI =	0.4
Total Body and Organ Weight HI =	0.3
Total Liver HI =	0.004
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.2
Total Eyes HI =	0.4
Total Immune System HI =	0.6
Total Nails HI =	0.4
Total Longevity HI =	0.3
Total Kidneys HI =	0.05
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.3
Total Thyroid HI =	10
Total Reproductive Effects HI =	0.003
Total Hair HI =	4
Total Development HI =	5
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	Benzo(a)anthracene	2.E-08	- -	5.E-08	7.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	5.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.005	0.006
			Benzo(b)fluoranthene	2.E-08	- -	6.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	8.E-09	- -	2.E-08	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.0004	0.0006
			Dibenzo(a,h)anthracene	5.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	3.E-08	4.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	4.E-07	- -	1.E-06	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	5.E-07	7.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.1	0.1
			Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.03	- -	0.01	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.03	- -	0.04	0.06
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin, Vascular	0.01	- -	0.01	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0006	- -	0.002	0.003
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.01	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00007	- -	0.001	0.00
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported	0.00	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.05	- -	0.01	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.07	- -	0.01	0.09
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.04	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.01	- -	0.03	0.03
			Silver	NV	- -	NV	NV	Silver	Skin	0.0006	- -	0.003	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.06	0.4
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.1	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood, Iimmune system	0.01	- -	0.002	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.022	0.03
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.1	- -	0.3	0.4
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.1	0.4
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	3.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	9.E-07	- -	6.E-06	6.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	2.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	4.E-07	- -	2.E-06	3.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	1.E-07	1.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	9.E-04	1.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						1.E-03						2

TABLE 9.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	7.E-12	- -	7.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	9.E-13	- -	9.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-14	- -	9.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	5.E-13	- -	5.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	1.E-08	- -	1.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	5.E-09	- -	5.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-09	- -	9.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	4.E-08	- -	4.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	rdiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	3.E-08	- -	3.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	2.E-13	- -	2.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	8.E-09	- -	8.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	2.E-14	- -	2.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	8.E-13	- -	8.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	9.E-09	- -	9.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	3.E-12	- -	3.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	4.E-10	- -	4.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-10	- -	2.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	2.E-10	- -	2.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	2.E-10	- -	2.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	9.E-11	- -	9.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						2.E-07						0.08
Soil Total							1.E-03						2

TABLE 9.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	9.E-08	- -	9.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	9.E-08	--	9.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						9.E-08						0.009
Groundwater Total							9.E-08						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	8.E-08	- -	3.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Arsenic	3.E-07	- -	4.E-07	7.E-07	Arsenic	Skin, Vascular	0.005	- -	0.007	0.01
			Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.02	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.01	- -	0.004	0.02
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.04	- -	0.01	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	3.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.03	0.06
			Radium-226	5.E-08	- -	2.E-07	3.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-08	- -	3.E-07	3.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total	--	0.09	--	0.07	0.2
	Exposure Medium Total						1.E-05						0.2
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	2.E-07	- -	2.E-07	4.E-07	Arsenic	Skin, Vascular	0.003	- -	0.004	0.007
			Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.006	0.007
			Bismuth-212	2.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	4.E-07	4.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	6.E-10	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	5.E-07	5.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	6.E-09	- -	3.E-07	3.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	1.E-07	- -	8.E-07	9.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-08	- -	4.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	6.E-08	- -	3.E-07	4.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	8.E-07	--	7.E-06	8.E-06	Chemical Total	--	0.003	--	0.01	0.01
	Exposure Medium Total						8.E-06						0.01
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0006	0.0008
			Arsenic	1.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.003	0.005
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.10	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.04	- -	0.01	0.06
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.004	0.02
			Dioxin-like PCBs	1.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-08	6.E-08	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.002	0.005
			Bismuth-212	3.E-11	- -	5.E-07	5.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	5.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	1.E-10	- -	3.E-08	3.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	8.E-10	- -	4.E-07	4.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	7.E-07	7.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-07	3.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	5.E-05	6.E-05	Chemical Total	--	0.08	--	0.2	0.2
	Exposure Medium Total						6.E-05						0.2

TABLE 9.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0004	- -	0.002	0.002
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-07	- -	5.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.005	- -	0.02	0.03
			Aroclor 1260	3.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.007	- -	0.01	0.02
			Arsenic	2.E-07	- -	3.E-07	5.E-07	Arsenic	Skin, Vascular	0.004	- -	0.005	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.006	0.006
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.001	- -	0.0004	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.005	- -	0.002	0.007
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.02	- -	0.2	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.02	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0007	0.003
			2,3,7,8-TCDD TEQ	4.E-08	- -	4.E-08	8.E-08	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.003	0.007
			Bismuth-212	3.E-11	- -	5.E-07	5.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	4.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	9.E-10	- -	4.E-07	4.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	7.E-07	7.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	8.E-08	- -	5.E-07	6.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-07	3.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total	--	1	--	0.6	2
	Exposure Medium Total						1.E-05						2
Sediment Total							9.E-05						2
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	0.0004	- -	0.007	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.004	0.03
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Radium-226	1.E-06	- -	2.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total	--	0.03	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	4.E-08	- -	7.E-07	7.E-07	Chromium (Hexavalent)	None Reported	0.00009	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.007	0.04
			High Risk PCBs	6.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-09	- -	6.E-07	6.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.05	0.05
			Potassium-40	8.E-08	- -	1.E-11	8.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	2.E-07	--	1.E-06	2.E-06	Chemical Total	--	0.04	--	0.06	0.09
	Exposure Medium Total						2.E-06						0.09

TABLE 9.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.005	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0006	- -	0.0001	0.001
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	0.8	0.8
			High Risk PCBs	6.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.1	0.1
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.1	--	1	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 6

Total Neurological HI =	0.2
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.002
Total Blood HI =	0.09
Total Skin/Vascular HI =	0.06
Total Eyes HI =	0.2
Total Immune System HI =	0.2
Total Nails HI =	0.2
Total Longevity HI =	0.08
Total Kidneys HI =	0.01
Total Gastrointestinal Tract HI =	0.2
Total None Reported HI =	0.3
Total Thyroid HI =	2
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.7
Total Development HI =	3
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Benzo(a)anthracene	1.E-08	- -	6.E-09	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-07	- -	6.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0006	0.002
			Benzo(b)fluoranthene	1.E-08	- -	7.E-09	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	5.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0001	- -	0.00006	0.0002
			Dibenzo(a,h)anthracene	3.E-08	- -	2.E-08	5.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	7.E-09	- -	4.E-09	1.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	9.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-07	- -	2.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.02	- -	0.01	0.04
			Aroclor 1260	7.E-07	- -	4.E-07	1.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.0008	0.02
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.02	- -	0.005	0.02
			Arsenic	8.E-07	- -	2.E-07	9.E-07	Arsenic	Skin, Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0004	- -	0.0003	0.0007
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00005	- -	0.0002	0.0002
			Chromium (Hexavalent)	5.E-07	- -	9.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.04
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.006	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.004	- -	0.004	0.008
			Silver	NV	- -	NV	NV	Silver	Skin	0.0004	- -	0.0004	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.01	- -	0.02	0.03
			Zinc	NV	- -	NV	NV	Zinc	Blood, Iimmune system	0.005	- -	0.0002	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0032	0.008
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development	0.07	- -	0.0	0.1
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Bismuth-212	2.E-10	- -	4.E-06	4.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	6.E-09	- -	3.E-06	3.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	7.E-08	- -	4.E-06	4.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	2.E-06	- -	1.E-05	1.E-05	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-07	- -	5.E-06	6.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-06	3.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-07	- -	5.E-06	6.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	4.E-08	- -	3.E-07	3.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.7	- -	0	1
	Exposure Medium Total						2.E-03						1

TABLE 9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	6.E-12	- -	6.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	7.E-13	- -	7.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-13	- -	2.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	4.E-13	- -	4.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-08	- -	3.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	2.E-08	- -	2.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	9.E-08	- -	9.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-10	- -	4.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	9.E-09	- -	9.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	5.E-10	- -	5.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	3.E-08	- -	3.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	7.E-08	- -	7.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	4.E-13	- -	4.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	3.E-14	- -	3.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	4.E-08	- -	4.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	2.E-12	- -	2.E-12	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	6.E-12	- -	6.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-09	- -	1.E-09	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	4.E-10	- -	4.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	5.E-10	- -	5.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	4.E-10	- -	4.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	2.E-10	- -	2.E-10	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	3.5E-07	--	3.5E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						4.E-07						0.08
Soil Total							2.E-03						1

TABLE 9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	2.E-07	- -	2.E-07	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						2.E-07						0.009
Groundwater Total							2.E-07						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	4.E-07	- -	4.E-07	8.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	5.E-07	- -	3.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	1.E-07	- -	5.E-07	6.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	5.E-06	6.E-06	Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total						6.E-06						0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	2.E-07	- -	2.E-07	5.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.004
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	4.E-11	- -	7.E-07	7.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	6.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	1.E-06	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	8.E-07	8.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	6.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	5.E-07	5.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	1.E-07	- -	8.E-07	9.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total		0.002	--	0.004	0.006
	Exposure Medium Total						1.E-05						0.006
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	2.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.009	- -	0.002	0.01
			Dioxin-like PCBs	2.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.007	- -	0.02	0.02
			2,3,7,8-TCDD TEQ	5.E-08	- -	2.E-08	7.E-08	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	6.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	7.E-07	8.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	9.E-07	9.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	9.E-07	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	9.E-08	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	3.E-05	3.E-05	Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total						3.E-05						0.1

TABLE 9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	3.E-09	- -	7.E-09	1.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.001
			Benzo(b)fluoranthene	2.E-09	- -	6.E-09	8.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	6.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	4.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	5.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	3.E-07	- -	3.E-07	6.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	7.E-08	- -	4.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.00
			Bismuth-212	6.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	9.E-07	9.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	1.E-06	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	8.E-08	- -	1.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						1.E-05						1
Sediment Total							6.E-05						1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	1.E-05	2.E-05	Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total						2.E-05						0.4

TABLE 9.3
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	3.E-08	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	9.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.00008	- -	0.02	0.02
			Potassium-40	2.E-07	- -	2.E-11	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	4.E-07	--	8.E-07	1.E-06	Chemical Total		0.02	--	0.02	0.05
	Exposure Medium Total						1.E-06						0.05
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.002	0.02
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0004	- -	0.00005	0.0005
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	9.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	7.E-06	- -	8.E-11	7.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	2.E-05	3.E-05	Chemical Total		0.08	--	0.4	0.4
	Exposure Medium Total						3.E-05						0.4
Surface Water Total							5.E-05						0.9

Total Risk Across All Media	2.E-03
Total Hazard Index Across All Media	3

Total Neurological HI =	0.1
Total Body and Organ Weight HI =	0.08
Total Liver HI =	0.002
Total Blood HI =	0.04
Total Skin/Vascular HI =	0.03
Total Eyes HI =	0.05
Total Immune System HI =	0.07
Total Nails HI =	0.05
Total Longevity HI =	0.03
Total Kidneys HI =	0.006
Total Gastrointestinal Tract HI =	0.09
Total None Reported HI =	0.1
Total Thyroid HI =	1
Total Reproductive Effects HI =	0.0007
Total Hair HI =	0.4
Total Development HI =	1
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil											
			Benzo(a)anthracene	2.E-07	- -	6.E-08	2.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological	0.01	- -	0.004	0.02
			Benzo(b)fluoranthene	2.E-07	- -	7.E-08	3.E-07	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-08	- -	9.E-09	5.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.002	- -	0.0004	0.002
			Dibenzo(a,h)anthracene	5.E-07	- -	2.E-07	7.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-07	- -	4.E-08	2.E-07	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	9.E-07	- -	3.E-07	1.E-06	Aroclor 1254	Eyes, Nails, Immune System	0.3	- -	0.09	0.4
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.2	- -	0.005	0.2
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.2	- -	0.03	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular	0.06	- -	0.008	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.006
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.0010	0.001
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.009	0.4
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.5	- -	0.01	0.5
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.04	0.10
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.04	- -	0.02	0.06
			Silver	NV	- -	NV	NV	Silver	Skin	0.004	- -	0.003	0.007
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Zinc	NV	- -	NV	NV	Zinc	Blood, Iimmune system	0.06	- -	0.001	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.06	- -	0.019	0.07
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0	2
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	1.E-06	- -	4.E-06	5.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	5.E-07	- -	2.E-06	2.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	8.E-08	1.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	8	- -	1	9
	Exposure Medium Total						9.E-04						9

TABLE 9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	3.E-10	- -	3.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	1.E-11	- -	1.E-11	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	1.E-12	- -	1.E-12	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	6.E-14	- -	6.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	3.E-12	- -	3.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	6.E-13	- -	6.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	9.E-09	- -	9.E-09	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	4.E-09	- -	4.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	6.E-09	- -	6.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-08	- -	3.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	rdiovascular system, Nervous sy	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	1.E-10	- -	1.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	5.E-14	- -	5.E-14	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	3.E-09	- -	3.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	5.E-15	- -	5.E-15	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	5.E-09	- -	5.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	3.E-13	- -	3.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	9.E-13	- -	9.E-13	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-10	- -	1.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	6.E-11	- -	6.E-11	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	7.E-11	- -	7.E-11	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	6.E-11	- -	6.E-11	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	3.E-11	- -	3.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	1.E-07	--	1.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						1.E-07						0.08
Soil Total							9.E-04						9

TABLE 9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.007	0.2
			Dioxin-like PCBs	1.E-06	- -	6.E-07	2.E-06	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	3.E-07	- -	3.E-08	3.E-07	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	7.E-11	- -	6.E-07	6.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	5.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	5.E-07	7.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	9.E-07	9.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	9.E-07	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	4.E-07	4.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		1	--	0.3	1
	Exposure Medium Total						1.E-04						1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	1.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	3.E-07	- -	2.E-07	5.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.03	- -	0.017	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	5.E-08	5.E-07	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.006	0.06
			Bismuth-212	7.E-11	- -	6.E-07	6.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	6.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	5.E-07	6.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	9.E-07	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	6.E-07	8.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	9.E-07	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	5.E-07	5.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	1.E-05	3.E-05	Chemical Total		17	--	1	18
	Exposure Medium Total						3.E-05						18
Sediment Total							1.E-04						20

TABLE 9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	2.E-10	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Potassium-40	7.E-08	- -	1.E-11	7.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	8.E-07	--	2.E-06	3.E-06	Chemical Total		0.2	--	0.07	0.3
	Exposure Medium Total						3.E-06						0.3
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.003	- -	0.0002	0.003
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			High Risk PCBs	2.E-08	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0009	- -	0.09	0.09
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.6	--	1	2
	Exposure Medium Total						9.E-05						2
Surface Water Total							1.E-04						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.4	- -	- -	0.4
			4,4'-DDE	5.E-07	- -	- -	5.E-07	4,4'-DDE	Liver	0.06	- -	- -	0.06
			4,4'-DDT	3.E-06	- -	- -	3.E-06	4,4'-DDT	Liver	0.2	- -	- -	0.2
			Aroclor 1254	1.E-05	- -	- -	1.E-05	Aroclor 1254	Eyes, Nails, Immune System	3	- -	- -	3
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.2	- -	- -	0.2
			Arsenic	2.E-04	- -	- -	2.E-04	Arsenic	Skin, Vascular	5	- -	- -	5
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.7	- -	- -	0.7
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.1	- -	- -	0.1
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.2	- -	- -	0.2
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.5	- -	- -	0.5
			Bismuth-214	2.E-05			2.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-08			5.E-08	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	4.E-06			4.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-05			1.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-07			3.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	9.E-07			9.E-07	Uranium-235		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		112	--	--	112
	Exposure Medium Total						1.E-03						112

TABLE 9.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	6.E-06	- -	- -	6.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.3	- -	- -	0.3
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Aroclor 1254	7.E-06	- -	- -	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Arsenic	7.E-05	- -	- -	7.E-05	Arsenic	Skin, Vascular	2	- -	- -	2
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.3	- -	- -	0.3
			Chromium (Hexavalent)	8.E-05	- -	- -	8.E-05	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.8	- -	- -	0.8
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	3	- -	- -	3
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	3.E-08			3.E-08	Cesium-137		NV	- -	- -	NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	- -	- -	NV
			Potassium-40	2.E-06			2.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	9.E-06			9.E-06	Radium-228		NV	- -	- -	NV
			Strontium-90	2.E-07			2.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	6.E-07			6.E-07	Uranium-235		NV	- -	- -	NV
			Chemical Total	3.E-04	--	--	3.E-04	Chemical Total		16	--	--	16
	Exposure Medium Total						3.E-04						16
Tissue Ingestion Total							1.E-03						128

Total Risk Across All Media	3.E-03

Total Hazard Index Across All Media	159

Total Neurological HI =	1
Total Body and Organ Weight HI =	0.6
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	7
Total Eyes HI =	6
Total Immune System HI =	9
Total Nails HI =	6
Total Longevity HI =	0.4
Total Kidneys HI =	0.3
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.6
Total Thyroid HI =	20
Total Reproductive Effects HI =	0.004
Total Hair HI =	4
Total Teeth HI =	0.2
Total Development HI =	112
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)anthracene	2.E-08	- -	5.E-08	7.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	5.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.005	0.01
			Benzo(b)fluoranthene	2.E-08	- -	6.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	8.E-09	- -	2.E-08	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.0004	0.001
			Dibenzo(a,h)anthracene	5.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	3.E-08	4.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	4.E-07	- -	1.E-06	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	5.E-07	7.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.10	0.1
			Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.03	- -	0.01	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.03	- -	0.04	0.1
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin, Vascular	0.01	- -	0.01	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.001	- -	0.002	0.003
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.01	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0001	- -	0.001	0.001
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.16	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.05	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.07	- -	0.01	0.1
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.04	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.01	- -	0.03	0.03
			Silver	NV	- -	NV	NV	Silver	Skin	0.001	- -	0.003	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.31	- -	0.06	0.4
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.12	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.01	- -	0.002	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.022	0.03
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.10	- -	0.29	0
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.22	- -	0.13	0
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	3.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	9.E-07	- -	6.E-06	6.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	2.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	4.E-07	- -	2.E-06	3.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	1.E-07	1.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	9.E-04	1.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						1.E-03						2

TABLE 9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	7.E-12	- -	7.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	9.E-13	- -	9.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-14	- -	9.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	5.E-13	- -	5.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	1.E-08	- -	1.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	5.E-09	- -	5.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-09	- -	9.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	4.E-08	- -	4.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	rdiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.0001	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0001	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	3.E-08	- -	3.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	2.E-13	- -	2.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	8.E-09	- -	8.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	2.E-14	- -	2.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	8.E-13	- -	8.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	9.E-09	- -	9.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	3.E-12	- -	3.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	4.E-10	- -	4.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-10	- -	2.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	2.E-10	- -	2.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	2.E-10	- -	2.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	9.E-11	- -	9.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						2.E-07						0.08
Soil Total							1.E-03						2

TABLE 9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.001	0.002
			Arsenic	2.E-07	- -	4.E-07	6.E-07	Arsenic	Skin, Vascular	0.004	- -	0.006	0.01
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.03	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.008	0.03
			Dioxin-like PCBs	2.E-07	- -	1.E-06	1.E-06	Dioxin-like PCBs	Development	0.02	- -	0.09	0.11
			2,3,7,8-TCDD TEQ	6.E-08	- -	6.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.005	0.01
			Bismuth-212	5.E-11	- -	9.E-07	9.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	5.E-08	5.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	8.E-07	8.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	8.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	6.E-05	6.E-05	Chemical Total		0.2	--	0.3	0.5
	Exposure Medium Total						6.E-05						0.5
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	9.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.010	- -	0.04	0.05
			Aroclor 1260	6.E-08	- -	3.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.03	0.04
			Arsenic	4.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.007	- -	0.01	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0007	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.003	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.04	- -	0.3	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.10	- -	0.03	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.005	- -	0.020	0.025
			2,3,7,8-TCDD TEQ	9.E-08	- -	8.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.007	- -	0.01	0.01
			Bismuth-212	5.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	8.E-08	- -	5.E-07	6.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	8.E-07	8.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	7.E-07	8.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	1.E-06	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	7.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total		2	--	1	4
	Exposure Medium Total						2.E-05						4
Sediment Total							8.E-05						4

TABLE 9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	3.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.003
			Chromium (Hexavalent)	6.E-08	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0001	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.01	0.06
			High Risk PCBs	9.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	9.E-07	9.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.07	0.07
			Potassium-40	1.E-07	- -	2.E-11	1.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	3.E-07	--	2.E-06	2.E-06	Chemical Total		0.05	--	0.09	0.1
	Exposure Medium Total						2.E-06						0.1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	4.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.004
			Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported	0.007	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00004	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.007	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0009	- -	0.0002	0.001
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0003	- -	0.1	0.1
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.2	--	1	2
	Exposure Medium Total						8.E-05						2
Surface Water Total							8.E-05						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	2.E-06	- -	- -	2.E-06	Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.2
			4,4'-DDE	5.E-07	- -	- -	5.E-07	4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	3.E-06	- -	- -	3.E-06	4,4'-DDT	Liver	0.1	- -	- -	0.1
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aroclor 1254	1.E-05	- -	- -	1.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	2.E-04	- -	- -	2.E-04	Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	2.E-07			2.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	1.E-05			1.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	4.E-05			4.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	1.E-06			1.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	3.E-06			3.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		66	--	--	66
	Exposure Medium Total						1.E-03						66

TABLE 9.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adolescen

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	4.E-06	- -	- -	4.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.2
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.05	- -	- -	0.05
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	7.E-05	- -	- -	7.E-05	Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05	Chromium (Hexavalent)	None Reported	0.08	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	1.E-07			1.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	9.E-06			9.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	4.E-05			4.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	8.E-07			8.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	2.E-06			2.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	3.E-04	--	--	3.E-04	Chemical Total		11	--	--	11
	Exposure Medium Total						3.E-04						11
Tissue Ingestion Total							1.E-03						77

Total Risk Across All Media	3.E-03

Total Hazard Index Across All Media	85
Total Neurological HI =	1
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.9
Total Blood HI =	2
Total Skin/Vascular HI =	4
Total Eyes HI =	4
Total Immune System HI =	6
Total Nails HI =	4
Total Longevity HI =	0.1
Total Kidneys HI =	0.20
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.5
Total Thyroid HI =	4
Total Reproductive Effects HI =	0.001
Total Hair HI =	1
Total Teeth HI =	0.1
Total Development HI =	66
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil											
			Benzo(a)anthracene	1.E-08	- -	6.E-09	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-07	- -	6.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0006	0.002
			Benzo(b)fluoranthene	1.E-08	- -	7.E-09	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	5.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0001	- -	0.00006	0.0002
			Dibenzo(a,h)anthracene	3.E-08	- -	2.E-08	5.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	7.E-09	- -	4.E-09	1.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	9.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-07	- -	2.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.02	- -	0.01	0.04
			Aroclor 1260	7.E-07	- -	4.E-07	1.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.0008	0.02
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.02	- -	0.005	0.02
			Arsenic	8.E-07	- -	2.E-07	9.E-07	Arsenic	Skin, Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0004	- -	0.0003	0.0007
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00005	- -	0.0002	0.0002
			Chromium (Hexavalent)	5.E-07	- -	9.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.04
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.006	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.004	- -	0.004	0.008
			Silver	NV	- -	NV	NV	Silver	Skin	0.0004	- -	0.0004	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.01	- -	0.02	0.03
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.005	- -	0.0002	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0032	0.008
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development	0.07	- -	0.0	0.1
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Bismuth-212	2.E-10	- -	4.E-06	4.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	6.E-09	- -	3.E-06	3.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	7.E-08	- -	4.E-06	4.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	2.E-06	- -	1.E-05	1.E-05	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-07	- -	5.E-06	6.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-06	3.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-07	- -	5.E-06	6.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	4.E-08	- -	3.E-07	3.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.7	- -	0.1	1
	Exposure Medium Total						2.E-03						1

TABLE 9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	6.E-12	- -	6.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	7.E-13	- -	7.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-13	- -	2.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	4.E-13	- -	4.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-08	- -	3.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	2.E-08	- -	2.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	9.E-08	- -	9.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-10	- -	4.E-10	Arsenic	diovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	9.E-09	- -	9.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	5.E-10	- -	5.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	3.E-08	- -	3.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	7.E-08	- -	7.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212	- -	4.E-13	- -	4.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	3.E-14	- -	3.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	4.E-08	- -	4.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	2.E-12	- -	2.E-12	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	6.E-12	- -	6.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-09	- -	1.E-09	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	4.E-10	- -	4.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	5.E-10	- -	5.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	4.E-10	- -	4.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	2.E-10	- -	2.E-10	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	4.E-07	--	4.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						4.E-07						0.08
Soil Total							2.E-03						1

TABLE 9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	4.E-08	6.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	4.E-07	- -	3.E-07	7.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.02
			Dioxin-like PCBs	4.E-07	- -	9.E-07	1.E-06	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	9.E-08	- -	5.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.00	0.01
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	2.E-06	2.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	5.E-08	- -	3.E-06	3.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	3.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	6.E-06	--	5.E-05	6.E-05	Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total						6.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-09	- -	1.E-08	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	5.E-09	- -	1.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	3.E-07	4.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	3.E-07	- -	8.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	8.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	9.E-08	- -	2.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	6.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.003	- -	0.0081	0.011
			2,3,7,8-TCDD TEQ	1.E-07	- -	7.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.00	0.01
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	2.E-06	2.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	5.E-08	- -	3.E-06	3.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	3.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-06	2.E-06	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	2.E-05	3.E-05	Chemical Total		2	--	0.5	2
	Exposure Medium Total						3.E-05						2
Sediment Total							8.E-05						2

TABLE 9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	4.E-08	- -	4.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.00009	- -	0.0009	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	1.E-10	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Potassium-40	2.E-07	- -	4.E-11	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	5.E-07	--	1.E-06	2.E-06	Chemical Total		0.04	--	0.03	0.07
	Exposure Medium Total						2.E-06						0.07
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0006	- -	0.00007	0.0007
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	5.E-05	Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total						5.E-05						0.7
Surface Water Total							5.E-05						0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	5.E-06	- -	- -	5.E-06	Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.22	- -	- -	0.22
			4,4'-DDE	1.E-06	- -	- -	1.E-06	4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	7.E-06	- -	- -	7.E-06	4,4'-DDT	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	4.E-04	- -	- -	4.E-04	Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-07			5.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Potassium-40	4.E-05			4.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-04			1.E-04	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	1.E-05			1.E-05	Uranium-235		NV	- -	- -	NV
			Chemical Total	3.E-03	--	--	3.E-03	Chemical Total		66	--	--	66
	Exposure Medium Total						3.E-03						66

TABLE 9.6
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	3.E-06	- -	- -	3.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	8.E-06	- -	- -	8.E-06	Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	2.E-04	- -	- -	2.E-04	Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported	0.09	- -	- -	0.09
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-07			5.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	3.E-05			3.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-04			1.E-04	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	9.E-06			9.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	8.E-04	--	--	8.E-04	Chemical Total		13	--	--	13
	Exposure Medium Total						8.E-04						13
Tissue Ingestion Total							4.E-03						79

Total Risk Across All Media	6.E-03
Total Hazard Index Across All Media	83

Total Neurological HI =	0.7
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1.0
Total Blood HI =	3
Total Skin/Vascular HI =	4
Total Eyes HI =	4
Total Immune System HI =	6
Total Nails HI =	4
Total Longevity HI =	0.04
Total Kidneys HI =	0.217
Total Gastrointestinal Tract HI =	1.1
Total None Reported HI =	0.3
Total Thyroid HI =	3
Total Reproductive Effects HI =	0.0009
Total Hair HI =	0.5
Total Teeth HI =	0.1
Total Development HI =	65
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	4.E-11	- -	5.E-12	4.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.0000004	- -	0.00000005	0.0000004
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.001	- -	0.0002	0.001
			1,4-Dichlorobenzene	1.E-09	- -	6.E-10	2.E-09	1,4-Dichlorobenzene	Liver	0.00001	- -	0.000005	0.00002
			Benzo(a)anthracene	3.E-08	- -	1.E-08	4.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	1.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Benzo(b)fluoranthene	2.E-08	- -	1.E-08	3.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	2.E-08	- -	8.E-09	3.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.00008	0.0003
			Dibenzo(a,h)anthracene	6.E-08	- -	3.E-08	1.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	8.E-09	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-08	- -	4.E-09	1.E-08	Dieldrin	Liver	0.00004	- -	0.00001	0.00005
			4,4'-DDT	3.E-10	- -	4.E-11	4.E-10	4,4'-DDT	Liver	0.000005	- -	0.0000007	0.000006
			Heptachlor epoxide	2.E-08	- -	1.E-08	3.E-08	Heptachlor epoxide	Liver	0.0005	- -	0.0002	0.0008
			Aroclor 1248	5.E-05	- -	3.E-05	8.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-05	- -	2.E-05	5.E-05	Aroclor 1254	Eyes, nails, immune system	2	- -	1	4
			Aroclor 1260	2.E-05	- -	9.E-06	2.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-04	- -	2.E-04	6.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.001	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.05	- -	0.01	0.07
			Arsenic	3.E-06	- -	7.E-07	4.E-06	Arsenic	Skin/Vascular	0.02	- -	0.005	0.03
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.001	- -	0.0008	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0007	- -	0.004	0.005
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.02	- -	0.003	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.001	- -	0.004	0.005
			Chromium (Hexavalent)	7.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.4	- -	0.02	0.5
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.09	- -	0.004	0.10
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0005	- -	0.00002	0.0005
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.02	0.03
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.02	- -	0.02	0.05
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0006	- -	0.00002	0.0006
			Silver	NV	- -	NV	NV	Silver	Skin	0.0007	- -	0.0007	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.02	0.04
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.01	- -	0.0006	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.0071	0.02
			Dioxin-like PCBs	3.E-05	- -	2.E-05	6.E-05	Dioxin-like PCBs	Development	1	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-05	- -	1.E-06	1.E-05	2,3,7,8-TCDD TEQ	Development	0.3	- -	0	0
			Bismuth-212	3.E-10	- -	4.E-05	4.E-05	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-04	- -	6.E-03	6.E-03	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-09	- -	1.E-06	1.E-06	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	3.E-04	- -	5.E-06	3.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	6.E-09	- -	3.E-05	3.E-05	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-04	- -	8.E-03	8.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	8.E-08	- -	4.E-05	4.E-05	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	4.E-06	- -	1.E-04	1.E-04	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	5.E-05	- -	1.E-03	2.E-03	Radium-226	NA	NV	- -	NV	NV
			Radium-228	4.E-07	- -	5.E-05	5.E-05	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-05	2.E-05	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	1.E-06	- -	5.E-05	5.E-05	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	4.E-08	- -	1.E-06	1.E-06	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	1.E-03	- -	2.E-02	2.E-02	Chemical Total	- -	5	- -	2	7
	Exposure Medium Total						2.E-02						7

TABLE 9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.00002	- -	0.00002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.02	- -	0.02
			1,4-Dichlorobenzene	- -	7.E-08	- -	7.E-08	1,4-Dichlorobenzene	Liver	- -	0.00002	- -	0.00002
			Benzo(a)anthracene	- -	9.E-10	- -	9.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-11	- -	3.E-11	Benzo(a)pyrene	Fetotoxicity	- -	0.0001	- -	0.00006
			Benzo(b)fluoranthene	- -	2.E-12	- -	2.E-12	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	6.E-13	- -	6.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	7.E-12	- -	7.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-12	- -	2.E-12	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-13	- -	6.E-13	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-14	- -	2.E-14	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-12	- -	1.E-12	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	5.E-06	- -	5.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-06	- -	3.E-06	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	8.E-07	- -	8.E-07	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners		5.E-05		5.E-05	High Risk PCB Congeners	NA		NV		NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.001	- -	0.001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-09	- -	3.E-09	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0001	- -	0.0001
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.0001	- -	0.0001
			Beryllium	- -	2.E-10	- -	2.E-10	Beryllium	Respiratory system, Immune system	- -	0.00001	- -	0.00001
			Cadmium	- -	2.E-09	- -	2.E-09	Cadmium	Kidneys	- -	0.0003	- -	0.0003
			Chromium (Total)		NV		NV	Chromium (Total)	NA		NV		NV
			Chromium (Hexavalent)	- -	2.E-08	- -	2.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.00001	- -	0.000007
			Cobalt	- -	8.E-08	- -	8.E-08	Cobalt	Respiratory System	- -	0.004	- -	0.004
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide		NV		NV	Cyanide	Thyroid		0.0000001		0.00000007
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.001	- -	0.001
			Nickel	- -	7.E-09	- -	7.E-09	Nickel	Respiratory System	- -	0.001	- -	0.001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.00000003	- -	0.00000003
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.0001	- -	0.0001
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.3	- -	0.3
			Dioxin-like PCBs	- -	1.E-06	- -	1.E-06	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.002	- -	0.002

TABLE 9.7
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air		2,3,7,8-TCDD TEQ	- -	4.E-07	- -	4.E-07	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0007	- -	0.0007
			Bismuth-212	- -	1.E-11	- -	1.E-11	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	4.E-07	- -	4.E-07	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	9.E-13	- -	9.E-13	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	6.E-07	- -	6.E-07	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	5.E-11	- -	5.E-11	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	5.E-07	- -	5.E-07	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	2.E-10	- -	2.E-10	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	3.E-08	- -	3.E-08	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-07	- -	2.E-07	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	1.E-08	- -	1.E-08	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	1.E-08	- -	1.E-08	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	3.E-09	- -	3.E-09	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	7.E-05	--	7.E-05	Chemical Total		--	0.4	--	0.4
	Exposure Medium Total						7.E-05						0.4
Soil Total							2.E-02						7

Total Risk Across All Media	2.E-02
Total Hazard Index Across All Media	7
Total Neurological HI =	0.4
Total Body and Organ Weight HI =	0.05
Total Liver HI =	0.02
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.03
Total Adrenal Glands HI =	0.0000004
Total Eyes HI =	4
Total Immune System HI =	4
Total Nails HI =	4
Total Longevity HI =	0.07
Total Kidneys HI =	0.04
Total Gastrointestinal Tract HI =	0.2
Total None Reported HI =	0.008
Total Thyroid HI =	0.5
Total Reproductive Effects HI =	0.004
Total Hair HI =	0.4
Total Teeth HI =	0.0006
Total Development HI =	2
Total Urinary Tract HI =	0.00002
Total Fetotoxicity HI =	0.0002
Total Cardiovascular System HI =	0.0001
Total Respiratory System HI =	0.009
Total Endocrine System HI =	0.003

TABLE 9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	3.E-11	- -	2.E-12	3.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.00000008	0.000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.004	- -	0.0003	0.004
			1,4-Dichlorobenzene	1.E-09	- -	2.E-10	1.E-09	1,4-Dichlorobenzene	Liver	0.00003	- -	0.000007	0.00004
			Benzo(a)anthracene	9.E-08	- -	3.E-08	1.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-07	- -	3.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.002	0.008
			Benzo(b)fluoranthene	6.E-08	- -	2.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	3.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0005	- -	0.0001	0.0007
			Dibenzo(a,h)anthracene	2.E-07	- -	7.E-08	3.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-08	- -	2.E-08	7.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	7.E-09	- -	2.E-09	8.E-09	Dieldrin	Liver	0.00010	- -	0.00002	0.0001
			4,4'-DDT	2.E-10	- -	2.E-11	2.E-10	4,4'-DDT	Liver	0.00002	- -	0.000001	0.00002
			Heptachlor epoxide	2.E-08	- -	4.E-09	2.E-08	Heptachlor epoxide	Liver	0.002	- -	0.0004	0.002
			Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.07	- -	0.002	0.07
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.1	- -	0.02	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular	0.06	- -	0.007	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.004	- -	0.001	0.005
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.002	- -	0.007	0.009
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.003	0.007
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.006	0.3
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.001	- -	0.00003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.2	- -	0.006	0.2
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.04	- -	0.03	0.07
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.06	- -	0.04	0.1
			Selenium	NV	- -	NV	NV	Selenium	ir, nails, blood, teeth, skin, central nervous syste	0.002	- -	0.00004	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.001	0.003
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.04	- -	0.04	0.08
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.04	- -	0.0009	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.03	- -	0.0113	0.04
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0	1
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	1.E-06	- -	4.E-06	5.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	5.E-07	- -	1.E-06	2.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	1.E-08	- -	4.E-08	6.E-08	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	14	- -	3	17
	Exposure Medium Total						1.E-03						17

TABLE 9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	2.E-09	- -	2.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	5.E-12	- -	5.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	3.E-13	- -	3.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-14	- -	2.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-12	- -	1.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	3.E-13	- -	3.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-14	- -	2.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	6.E-16	- -	6.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	4.E-14	- -	4.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-07	- -	2.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	9.E-08	- -	9.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-08	- -	3.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	7.E-12	- -	7.E-12	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	4.E-09	- -	4.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00000001	- -	0.00000001
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	4.E-08	- -	4.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	1.E-08	- -	1.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	5.E-14	- -	5.E-14	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-09	- -	2.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	5.E-15	- -	5.E-15	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	3.E-09	- -	3.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	3.E-13	- -	3.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	9.E-13	- -	9.E-13	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-10	- -	1.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	9.E-10	- -	9.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	7.E-11	- -	7.E-11	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	6.E-11	- -	6.E-11	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	2.E-11	- -	2.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						2.E-06						0.05
Soil Total							1.E-03						17

TABLE 9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.007	0.2
			Dioxin-like PCBs	1.E-06	- -	6.E-07	2.E-06	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	3.E-07	- -	3.E-08	3.E-07	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	7.E-11	- -	6.E-07	6.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	5.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	5.E-07	7.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	9.E-07	9.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	9.E-07	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	4.E-07	4.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		1	--	0.3	1
	Exposure Medium Total						1.E-04						1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	1.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	3.E-07	- -	2.E-07	5.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.03	- -	0.02	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	5.E-08	5.E-07	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.006	0.06
			Bismuth-212	7.E-11	- -	6.E-07	6.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	6.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	5.E-07	6.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	9.E-07	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	6.E-07	8.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	9.E-07	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	5.E-07	5.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	1.E-05	3.E-05	Chemical Total		17	--	1	18
	Exposure Medium Total						3.E-05						18
Sediment Total							1.E-04						20

TABLE 9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	2.E-10	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Potassium-40	7.E-08	- -	1.E-11	7.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	8.E-07	--	2.E-06	3.E-06	Chemical Total		0.2	--	0.07	0.3
	Exposure Medium Total						3.E-06						0.3
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.003	- -	0.0002	0.003
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			High Risk PCBs	2.E-08	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0009	- -	0.09	0.09
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.6	--	1	2
	Exposure Medium Total						9.E-05						2
Surface Water Total							1.E-04						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.4	- -	- -	0.37
			4,4'-DDE	5.E-07	- -	- -	5.E-07	4,4'-DDE	Liver	0.06	- -	- -	0.06
			4,4'-DDT	3.E-06	- -	- -	3.E-06	4,4'-DDT	Liver	0.2	- -	- -	0.2
			Aroclor 1254	1.E-05	- -	- -	1.E-05	Aroclor 1254	Eyes, Nails, Immune System	3	- -	- -	3
			High Risk PCBs	1.E-04	- -	- -	1.E-04	High Risk PCBs		NV	--	:--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.2	- -	- -	0.2
			Arsenic	1.E-04	- -	- -	1.E-04	Arsenic	Skin, Vascular	5	- -	- -	5
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.7	- -	- -	0.7
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.1	- -	- -	0.1
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.2	- -	- -	0.2
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.5	- -	- -	0.5
			Bismuth-214	2.E-05	- -	- -	2.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-08	- -	- -	5.E-08	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-05	- -	- -	2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	4.E-06	- -	- -	4.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-05	- -	- -	1.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-07	- -	- -	3.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	9.E-07			9.E-07	Uranium-235		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		112	--	--	112
	Exposure Medium Total						1.E-03						112

TABLE 9.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	6.E-06	- -	- -	6.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.3	- -	- -	0.26
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	7.E-06	- -	- -	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Arsenic	7.E-05	- -	- -	7.E-05	Arsenic	Skin, Vascular	2	- -	- -	2
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.3	- -	- -	0.3
			Chromium (Hexavalent)	4.E-06	- -	- -	4.E-06	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.8	- -	- -	0.8
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	3	- -	- -	3
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	3.E-08			3.E-08	Cesium-137		NV	- -	- -	NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	- -	- -	NV
			Potassium-40	2.E-06			2.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	9.E-06			9.E-06	Radium-228		NV	- -	- -	NV
			Strontium-90	2.E-07			2.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	6.E-07			6.E-07	Uranium-235		NV	- -	- -	NV
			Chemical Total	2.E-04	--	--	2.E-04	Chemical Total		16	--	--	16
	Exposure Medium Total						2.E-04						16
Tissue Ingestion Total							1.E-03						128

Total Risk Across All Media: 3.E-03

Total Hazard Index Across All Media: 167

Total Neurological HI =	1
Total Body and Organ Weight HI =	0.7
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	7
Total Adrenal Glands HI =	0.000001
Total Eyes HI =	14
Total Immune System HI =	17
Total Nails HI =	14
Total Longevity HI =	0.3
Total Kidneys HI =	0.3
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.6
Total Thyroid HI =	20
Total Reproductive Effects HI =	0.005
Total Hair HI =	2
Total Teeth HI =	0.2
Total Development HI =	114
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	Hair	0.2	- -	0.007	0.2
			Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		1	--	0.3	1
	Exposure Medium Total							1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	Thyroid	16	- -	0.6	16
			Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	Autoimmune Effects	0.03	- -	0.02	0.05
			2,3,7,8-TCDD TEQ	Development	0.05	- -	0.01	0.06
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		17	--	1	18
	Exposure Medium Total							18
Sediment Total								20

TABLE 9.9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0004	- -	0.06	0.06
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total		0.2	--	0.07	0.3
	Exposure Medium Total							0.3
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	Hair	0.1	- -	0.006	0.1
			Cyanide	Reproductive Effects	0.003	- -	0.0002	0.003
			Dioxin-Like PCBs	Development	0.004	- -	1	1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.6	--	1	2
	Exposure Medium Total							2
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.3	- -	- -	0.3
			Dieldrin	Liver	0.09	- -	- -	0.09
			4,4'-DDD	Liver	0.9	- -	- -	0.9
			4,4'-DDE	Liver	0.1	- -	- -	0.1
			4,4'-DDT	Liver	0.6	- -	- -	0.6
			Aroclor 1254	Eyes, Nails, Immune System	8	- -	- -	8
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	0.5	- -	- -	0.5
			Arsenic	Skin, Vascular	11	- -	- -	11
			Chromium (Hexavalent)	None Reported	0.02	- -	- -	0.02
			Cobalt	Thyroid	2	- -	- -	2
			Copper	Gastrointestinal Tract	0.3	- -	- -	0.3
			Iron	Gastrointestinal Tract	0.9	- -	- -	0.9
			Manganese	Neurological	0.9	- -	- -	0.9
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.4	- -	- -	0.4
			Zinc	Blood, Immune System	1	- -	- -	1
			Dioxin-like PCBs	Development	8	- -	- -	8
			2,3,7,8-TCDD TEQ	Development	227	- -	- -	227
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		263	--	--	263
	Exposure Medium Total							263

TABLE 9.9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.2	- -	- -	0.2
			Dieldrin	Liver	0.2	- -	- -	0.2
			4,4'-DDD	Liver	NV	- -	- -	NV
			4,4'-DDE	Liver	NV	- -	- -	NV
			Heptachlor epoxide	Liver	0.6	- -	- -	0.6
			Aroclor 1254	Eyes, Nails, Immune System	8	- -	- -	8
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	6	- -	- -	6
			Cadmium	Kidneys	1	- -	- -	1
			Chromium (Hexavalent)	None Reported	0.4	- -	- -	0.4
			Cobalt	Thyroid	2	- -	- -	2
			Copper	Gastrointestinal Tract	3	- -	- -	3
			Iron	Gastrointestinal Tract	0.5	- -	- -	0.5
			Zinc	Blood, Immune System	10	- -	- -	10
			Mercury	Development, Neurological	1	- -	- -	1
			Dioxin-like PCBs	Development	19	- -	- -	19
			2,3,7,8-TCDD TEQ	Development	6	- -	- -	6
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		58	--	--	58
	Exposure Medium Total							58
Tissue Ingestion Total								320

Total Hazard Index Across All Media	342
Total Neurological HI =	3
Total Body and Organ Weight HI =	0.6
Total Liver HI =	3
Total Blood HI =	12
Total Skin/Vascular HI =	18
Total Eyes HI =	16
Total Immune System HI =	27
Total Nails HI =	16
Total Longevity HI =	0.1
Total Gastrointestinal Tract HI =	5
Total None Reported HI =	0.9
Total Thyroid HI =	21
Total Reproductive Effects HI =	0.003
Total Hair HI =	2
Total Teeth HI =	0.4
Total Development HI =	263

TABLE 9.10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-12	- -	3.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000009	0.0000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0005	- -	0.0003	0.0008
			1,4-Dichlorobenzene	2.E-10	- -	4.E-10	6.E-10	1,4-Dichlorobenzene	Liver	0.000004	- -	0.000009	0.00001
			Benzo(a)anthracene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-08	- -	2.E-07	3.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.002	0.003
			Benzo(b)fluoranthene	6.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	5.E-09	8.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00007	- -	0.0002	0.0002
			Dibenzo(a,h)anthracene	2.E-08	- -	6.E-08	8.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-09	- -	1.E-08	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	3.E-09	4.E-09	Dieldrin	Liver	0.00001	- -	0.00003	0.00004
			4,4'-DDT	5.E-11	- -	3.E-11	8.E-11	4,4'-DDT	Liver	0.000002	- -	0.000001	0.000003
			Heptachlor epoxide	3.E-09	- -	7.E-09	1.E-08	Heptachlor epoxide	Liver	0.0002	- -	0.0004	0.0006
			Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.010	- -	0.002	0.01
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.02	- -	0.03	0.05
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin/Vascular	0.008	- -	0.009	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0005	- -	0.001	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0003	- -	0.008	0.008
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.006	- -	0.005	0.011
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0004	- -	0.007	0.007
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.004	0.005
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.04	- -	0.008	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0002	- -	0.00004	0.0002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.03	- -	0.007	0.04
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.03	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.009	- -	0.04	0.05
			Selenium	NV	- -	NV	NV	Selenium	blood, teeth, skin, central nervo	0.0002	- -	0.00004	0.0003
			Silver	NV	- -	NV	NV	Silver	Skin	0.0003	- -	0.001	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.03	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.006	- -	0.05	0.05
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.005	- -	0.001	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0134	0.018
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0	0
			Bismuth-212	9.E-11	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	3.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	9.E-07	- -	6.E-06	6.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	4.E-07	- -	2.E-06	3.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	9.E-09	- -	6.E-08	7.E-08	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	6
	Exposure Medium Total						1.E-03						6

TABLE 9.10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	3.E-09	- -	3.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	3.E-14	- -	3.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	9.E-13	- -	9.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	3.E-14	- -	3.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	9.E-16	- -	9.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	6.E-14	- -	6.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-07	- -	3.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-07	- -	1.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-08	- -	4.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	rdiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	1.E-11	- -	1.E-11	Beryllium	spiratory system, Immune syste	- -	0.000002	- -	0.000002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	4.E-10	- -	4.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	cardiovascular system, neurol	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	6.E-08	- -	6.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	2.E-13	- -	2.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	7.E-09	- -	7.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	1.E-14	- -	1.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	9.E-09	- -	9.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	8.E-13	- -	8.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	8.E-09	- -	8.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	3.E-12	- -	3.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	4.E-10	- -	4.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	3.E-09	- -	3.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	2.E-10	- -	2.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	2.E-10	- -	2.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	5.E-11	- -	5.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						3.E-06						0.05
Soil Total							1.E-03						6

TABLE 9.10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.001	0.002
			Arsenic	2.E-07	- -	4.E-07	6.E-07	Arsenic	Skin, Vascular	0.004	- -	0.006	0.01
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.03	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.008	0.03
			Dioxin-like PCBs	2.E-07	- -	1.E-06	1.E-06	Dioxin-like PCBs	Development	0.02	- -	0.09	0.1
			2,3,7,8-TCDD TEQ	6.E-08	- -	6.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.005	0.01
			Bismuth-212	5.E-11	- -	9.E-07	9.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	5.E-08	5.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	8.E-07	8.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	8.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	6.E-05	6.E-05	Chemical Total		0.2	--	0.3	0.5
	Exposure Medium Total						6.E-05						0.5
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	9.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.010	- -	0.04	0.05
			Aroclor 1260	6.E-08	- -	3.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.03	0.04
			Arsenic	4.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.007	- -	0.01	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0007	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.003	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.04	- -	0.3	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.10	- -	0.03	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.005	- -	0.02	0.02
			2,3,7,8-TCDD TEQ	9.E-08	- -	8.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.007	- -	0.007	0.01
			Bismuth-212	5.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	8.E-08	- -	5.E-07	6.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	8.E-07	8.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	7.E-07	8.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	1.E-06	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	7.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total		2	--	1	4
	Exposure Medium Total						2.E-05						4
Sediment Total							8.E-05						4
Surface Water	Paradise Creek	Paradise Creek	Arsenic	2.E-07	- -	3.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.003
			Chromium (Hexavalent)	6.E-08	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0001	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.01	0.06
			High Risk PCBs	9.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	9.E-07	9.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.07	0.07
			Potassium-40	1.E-07	- -	2.E-11	1.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	3.E-07	--	2.E-06	2.E-06	Chemical Total		0.05	--	0.09	0.1
	Exposure Medium Total						2.E-06						0.1

TABLE 9.10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland	Estuarine Wetland	Arsenic	2.E-07	- -	4.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.004
			Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00004	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.01	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.001	- -	0.0002	0.001
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0003	- -	0.1	0.1
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.2	--	1	2
	Exposure Medium Total						8.E-05						2
Surface Water Total							8.E-05						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	2.E-06	- -	- -	2.E-06	Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.22
			4,4'-DDE	5.E-07	- -	- -	5.E-07	4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	3.E-06	- -	- -	3.E-06	4,4'-DDT	Liver	0.1	- -	- -	0.1
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aroclor 1254	1.E-05	- -	- -	1.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	1.E-04	- -	- -	1.E-04	Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	2.E-07			2.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	1.E-05			1.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	4.E-05			4.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	1.E-06			1.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	3.E-06			3.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		66	--	--	66
	Exposure Medium Total						1.E-03						66

TABLE 9.10
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	4.E-06	- -	- -	4.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	3.E-06	- -	- -	3.E-06	Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.2
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.05	- -	- -	0.05
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	7.E-05	- -	- -	7.E-05	Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.08
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	1.E-07			1.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	9.E-06			9.E-06	Potassium-40		NV	- -	- -	NV
			Radium-228	4.E-05			4.E-05	Radium-228		NV	- -	- -	NV
			Strontium-90	8.E-07			8.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	2.E-06			2.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	3.E-04	--	--	3.E-04	Chemical Total		11	--	--	11
	Exposure Medium Total						3.E-04						11
Tissue Ingestion Total							1.E-03						77

Total Risk Across All Media	3.E-03
Total Hazard Index Across All Media	89

Total Neurological HI =	0.8
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.9
Total Blood HI =	2
Total Skin/Vascular HI =	4
Total Adrenal Glands HI =	0.0000002
Total Eyes HI =	7
Total Immune System HI =	9
Total Nails HI =	7
Total Longevity HI =	0.09
Total Kidneys HI =	0.2
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.5
Total Thyroid HI =	4
Total Reproductive Effects HI =	0.002
Total Hair HI =	0.6
Total Teeth HI =	0.1
Total Development HI =	67
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			1,2,4-Trichlorobenzene	8.E-12	- -	1.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000001	0.0000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0003	- -	0.00004	0.0004
			1,4-Dichlorobenzene	3.E-10	- -	1.E-10	4.E-10	1,4-Dichlorobenzene	Liver	0.000003	- -	0.000001	0.000004
			Benzo(a)anthracene	6.E-09	- -	3.E-09	9.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0006	- -	0.0003	0.0009
			Benzo(b)fluoranthene	4.E-09	- -	2.E-09	6.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-09	- -	2.E-09	6.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00005	- -	0.00002	0.00007
			Dibenzo(a,h)anthracene	1.E-08	- -	7.E-09	2.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	3.E-09	- -	2.E-09	5.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	2.E-09	- -	9.E-10	3.E-09	Dieldrin	Liver	0.000009	- -	0.000004	0.00001
			4,4'-DDT	7.E-11	- -	9.E-12	8.E-11	4,4'-DDT	Liver	0.000001	- -	0.0000002	0.000002
			Heptachlor epoxide	5.E-09	- -	2.E-09	7.E-09	Heptachlor epoxide	Liver	0.0001	- -	0.00006	0.0002
			Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system	0.6	- -	0.4	1
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.007	- -	0.0003	0.007
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.01	- -	0.004	0.02
			Arsenic	7.E-07	- -	2.E-07	9.E-07	Arsenic	Skin/Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0003	- -	0.0002	0.0006
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0002	- -	0.001	0.001
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.0010	0.001
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0003	- -	0.0006	0.0009
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0001	- -	0.000005	0.0001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.02	- -	0.0009	0.02
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.004	- -	0.004	0.008
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.006	- -	0.006	0.01
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0001	- -	0.000006	0.0002
			Silver	NV	- -	NV	NV	Silver	Skin	0.0002	- -	0.0002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.004	0.09
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.004	- -	0.007	0.01
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.003	- -	0.0001	0.004
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.003	- -	0.0019	0.005
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development	0.3	- -	0	0
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.09	- -	0.0	0.1
			Bismuth-212	2.E-10	- -	4.E-06	4.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	6.E-09	- -	3.E-06	3.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	6.E-08	- -	4.E-06	4.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	2.E-06	- -	1.E-05	1.E-05	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-07	- -	5.E-06	5.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-06	3.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-07	- -	5.E-06	6.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	1.E-07	2.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						2.E-03						2

TABLE 9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions	1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	7.E-09	- -	7.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	9.E-11	- -	9.E-11	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	7.E-14	- -	7.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	8.E-13	- -	8.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-14	- -	6.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-15	- -	2.E-15	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-13	- -	1.E-13	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	6.E-07	- -	6.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-07	- -	3.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-08	- -	9.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-10	- -	3.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	2.E-11	- -	2.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	9.E-09	- -	9.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	cardiovascular system, neurolo	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	1.E-07	- -	1.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	4.E-08	- -	4.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	3.E-13	- -	3.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	3.E-14	- -	3.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	2.E-12	- -	2.E-12	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	6.E-12	- -	6.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-09	- -	1.E-09	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	6.E-09	- -	6.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	5.E-10	- -	5.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	4.E-10	- -	4.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	1.E-10	- -	1.E-10	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	7.E-06	--	7.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						7.E-06						0.05
Soil Total							2.E-03						2

TABLE 9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	4.E-08	6.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	4.E-07	- -	3.E-07	7.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.02
			Dioxin-like PCBs	4.E-07	- -	9.E-07	1.E-06	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	9.E-08	- -	5.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.002	0.01
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	2.E-06	2.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	5.E-08	- -	3.E-06	3.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	3.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	6.E-06	--	5.E-05	6.E-05	Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total						6.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-09	- -	1.E-08	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	5.E-09	- -	1.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	3.E-07	4.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	3.E-07	- -	8.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	8.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	9.E-08	- -	2.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	6.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.003	- -	0.0081	0.011
			2,3,7,8-TCDD TEQ	1.E-07	- -	7.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.003	0.01
			Bismuth-212	1.E-10	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	2.E-06	2.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	5.E-08	- -	3.E-06	3.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	3.E-06	3.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-06	2.E-06	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	2.E-05	3.E-05	Chemical Total		2	--	0.5	2
	Exposure Medium Total						3.E-05						2
Sediment Total							8.E-05						2
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	4.E-08	- -	4.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0001	- -	0.0009	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	1.E-10	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Potassium-40	2.E-07	- -	4.E-11	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	5.E-07	--	1.E-06	2.E-06	Chemical Total		0.04	--	0.03	0.07
	Exposure Medium Total						2.E-06						0.07

TABLE 9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0006	- -	0.00007	0.0007
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	5.E-05	Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total						5.E-05						0.7
Surface Water Total							5.E-05						0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	5.E-06	- -	- -	5.E-06	Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.22	- -	- -	0.22
			4,4'-DDE	1.E-06	- -	- -	1.E-06	4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	7.E-06	- -	- -	7.E-06	4,4'-DDT	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aluminum	NV	- -	- -	NV	Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	4.E-04	- -	- -	4.E-04	Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	NV	- -	- -	NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-07			5.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Potassium-40	4.E-05			4.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-04			1.E-04	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	1.E-05			1.E-05	Uranium-235		NV	- -	- -	NV
			Chemical Total	3.E-03	--	--	3.E-03	Chemical Total		66	--	--	66
	Exposure Medium Total						3.E-03						66

TABLE 9.11
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	3.E-06	- -	- -	3.E-06	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	8.E-06	- -	- -	8.E-06	Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	2.E-04	- -	- -	2.E-04	Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	NV	- -	- -	NV	Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.09
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	NV	- -	- -	NV	Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	5.E-07			5.E-07	Cesium-137		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	3.E-05			3.E-05	Potassium-40		NV	- -	- -	NV
			Radium-228	1.E-04			1.E-04	Radium-228		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	9.E-06			9.E-06	Uranium-235		NV	- -	- -	NV
			Chemical Total	8.E-04	--	--	8.E-04	Chemical Total		13	--	--	13
	Exposure Medium Total						8.E-04						13
Tissue Ingestion Total							4.E-03						79

Total Risk Across All Media: 6.E-03

Total Hazard Index Across All Media: 84

Total Neurological HI =	0.7
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1
Total Blood HI =	3
Total Skin/Vascular HI =	4
Total Adrenal Glands HI =	0.0000001
Total Eyes HI =	5
Total Immune System HI =	7
Total Nails HI =	5
Total Longevity HI =	0.04
Total Kidneys HI =	0.2
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.3
Total Thyroid HI =	3
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.4
Total Teeth HI =	0.1
Total Development HI =	66
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fishermar
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	Hair	0.02	- -	0.003	0.02
			Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	Development	0.004	- -	0.002	0.01
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total							0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	Thyroid	1	- -	0.3	2
			Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	Autoimmune Effects	0.003	- -	0.0081	0.011
			2,3,7,8-TCDD TEQ	Development	0.005	- -	0.003	0.01
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		2	--	0.5	2
	Exposure Medium Total							2
Sediment Total								2

TABLE 9.12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fishermar
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	None Reported	0.00009	- -	0.0009	0.0009
			Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total		0.04	--	0.03	0.07
	Exposure Medium Total							0.07
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	Hair	0.02	- -	0.003	0.03
			Cyanide	Reproductive Effects	0.0006	- -	0.00007	0.0007
			Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total							0.7
Surface Water Total								0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.4	- -	- -	0.4
			Dieldrin	Liver	0.1	- -	- -	0.1
			4,4'-DDD	Liver	1.0	- -	- -	1.0
			4,4'-DDE	Liver	0.2	- -	- -	0.2
			4,4'-DDT	Liver	0.7	- -	- -	0.7
			Aroclor 1254	Eyes, Nails, Immune System	10	- -	- -	10
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	0.6	- -	- -	0.6
			Arsenic	Skin, Vascular	14	- -	- -	14
			Chromium (Hexavalent)	None Reported	0.02	- -	- -	0.02
			Cobalt	Thyroid	2	- -	- -	2
			Copper	Gastrointestinal Tract	0.3	- -	- -	0.3
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Manganese	Neurological	1	- -	- -	1
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.5	- -	- -	0.5
			Zinc	Blood, Immune System	1	- -	- -	1
			Dioxin-like PCBs	Development	10	- -	- -	10
			2,3,7,8-TCDD TEQ	Development	270	- -	- -	270
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		313	--	--	313
	Exposure Medium Total							313

TABLE 9.12
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fishermar
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.3	- -	- -	0.3
			Dieldrin	Liver	0.3	- -	- -	0.3
			4,4'-DDD	Liver	2	- -	- -	2
			4,4'-DDE	Liver	0.5	- -	- -	0.5
			Heptachlor epoxide	Liver	1	- -	- -	1
			Aroclor 1254	Eyes, Nails, Immune System	14	- -	- -	14
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	12	- -	- -	12
			Cadmium	Kidneys	2	- -	- -	2
			Chromium (Hexavalent)	None Reported	0.8	- -	- -	0.8
			Cobalt	Thyroid	4	- -	- -	4
			Copper	Gastrointestinal Tract	5	- -	- -	5
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Zinc	Blood, Immune System	18	- -	- -	18
			Mercury	Development, Neurological	2	- -	- -	2
			Dioxin-like PCBs	Development	36	- -	- -	36
			2,3,7,8-TCDD TEQ	Development	11	- -	- -	11
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		108	--	--	108
	Exposure Medium Total							108
Tissue Ingestion Total								421

Total Hazard Index Across All Media	424

Total Neurological HI =	4
Total Body and Organ Weight HI =	0.2
Total Liver HI =	6
Total Blood HI =	20
Total Skin/Vascular HI =	26
Total Eyes HI =	24
Total Immune System HI =	43
Total Nails HI =	24
Total Longevity HI =	0.02
Total Gastrointestinal Tract HI =	8
Total None Reported HI =	0.9
Total Thyroid HI =	8
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.6
Total Teeth HI =	0.5
Total Development HI =	329

TABLE 9.13

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	3.E-07	- -	2.E-07	6.E-07
			Arsenic	2.E-06	- -	5.E-07	2.E-06
			Chromium (Hexavalent)	9.E-05	- -	2.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Dioxin-like PCBs	2.E-06	- -	2.E-06	3.E-06
			2,3,7,8-TCDD TEQ	4.E-07	- -	8.E-08	5.E-07
			Bismuth-212	2.E-10	- -	3.E-06	3.E-06
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Cesium-137	8.E-10	- -	2.E-07	2.E-07
			Lead-212	6.E-09	- -	2.E-06	2.E-06
			Lead-214	4.E-07	- -	2.E-06	3.E-06
			Potassium-40	8.E-08	- -	4.E-06	4.E-06
			Radium-228	3.E-07	- -	4.E-06	4.E-06
			Thallium-208	NV	- -	2.E-06	NV
			Chemical Total	9.E-05	--	2.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	1.E-07	- -	8.E-08	2.E-07
			Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Benzo(b)fluoranthene	9.E-08	- -	6.E-08	2.E-07
			Dibenzo(a,h)anthracene	2.E-06	- -	1.E-06	4.E-06
			Aroclor 1248	1.E-06	- -	1.E-06	3.E-06
			Aroclor 1254	3.E-07	- -	3.E-07	6.E-07
			Aroclor 1260	4.E-07	- -	4.E-07	8.E-07
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-06	- -	9.E-07	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	1.E-05	- -	3.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	6.E-07	- -	1.E-07	7.E-07
			Bismuth-212	2.E-10	- -	3.E-06	3.E-06
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Lead-212	6.E-09	- -	2.E-06	2.E-06
			Lead-214	3.E-07	- -	2.E-06	2.E-06
			Potassium-40	9.E-08	- -	4.E-06	4.E-06
			Radium-226	5.E-07	- -	3.E-06	3.E-06
			Radium-228	3.E-07	- -	4.E-06	4.E-06
			Thallium-208	NV	- -	2.E-06	2.E-06
			Chemical Total	2.E-05	--	5.E-05	7.E-05
	Exposure Medium Total						7.E-05
Sediment Total							4.E-04

TABLE 9.13

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	7.E-07	- -	8.E-08	7.E-07
			Chromium (Hexavalent)	4.E-07	- -	2.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	3.E-10	- -	5.E-08	5.E-08
			2,3,7,8-TCDD TEQ	8.E-09	- -	2.E-06	2.E-06
			Potassium-40	3.E-07	- -	5.E-11	3.E-07
			Chemical Total	1.E-06	--	4.E-06	5.E-06
	Exposure Medium Total						5.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	7.E-07	- -	8.E-08	8.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	5.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	4.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	1.E-08	- -	3.E-06	3.E-06
			Radium-226	1.E-05	- -	2.E-10	1.E-05
			Chemical Total	3.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							1.E-04
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-05	- -	- -	2.E-05
			Dieldrin	3.E-05	- -	- -	3.E-05
			4,4'-DDD	3.E-06	- -	- -	3.E-06
			4,4'-DDE	6.E-06	- -	- -	6.E-06
			4,4'-DDT	4.E-05	- -	- -	4.E-05
			Aroclor 1254	1.E-04	- -	- -	1.E-04
			High Risk PCBs	2.E-03	- -	- -	2.E-03
			Aluminum	NV	- -	- -	NV
			Arsenic	2.E-03	- -	- -	2.E-03
			Chromium (Hexavalent)	1.E-05	- -	- -	1.E-05
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Dioxin-like PCBs	3.E-04	- -	- -	3.E-04
			2,3,7,8-TCDD TEQ	9.E-03	- -	- -	9.E-03
			Bismuth-214	9.E-04	- -	- -	9.E-04
			Cesium-137	3.E-06	- -	- -	3.E-06
			Lead-214	1.E-03	- -	- -	1.E-03
			Potassium-40	2.E-04	- -	- -	2.E-04
			Radium-228	7.E-04	- -	- -	7.E-04
			Strontium-90	2.E-05	- -	- -	2.E-05
			Uranium-235	5.E-05	- -	- -	5.E-05
			Chemical Total	2.E-02	--	--	2.E-02
	Exposure Medium Total						2.E-02

TABLE 9.13

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	3.E-05	- -	- -	3.E-05
			Aldrin	5.E-05	- -	- -	5.E-05
			Dieldrin	8.E-05	- -	- -	8.E-05
			4,4'-DDD	4.E-06	- -	- -	4.E-06
			4,4'-DDE	2.E-05	- -	- -	2.E-05
			Heptachlor epoxide	4.E-05	- -	- -	4.E-05
			High Risk PCBs	5.E-04	- -	- -	5.E-04
			Aroclor 1254	2.E-04	- -	- -	2.E-04
			Arsenic	2.E-03	- -	- -	2.E-03
			Cadmium	NV	- -	- -	NV
			Chromium (Hexavalent)	4.E-04	- -	- -	4.E-04
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	1.E-03	- -	- -	1.E-03
			2,3,7,8-TCDD TEQ	3.E-04	- -	- -	3.E-04
			Bismuth-214	1.E-03	- -	- -	1.E-03
			Cesium-137	4.E-06	- -	- -	4.E-06
			Lead-214	5.E-04	- -	- -	5.E-04
			Potassium-40	3.E-04	- -	- -	3.E-04
			Radium-228	1.E-03	- -	- -	1.E-03
			Strontium-90	3.E-05	- -	- -	3.E-05
			Uranium-235	8.E-05	- -	- -	8.E-05
			Chemical Total	8.E-03	--	--	8.E-03
	Exposure Medium Total						8.E-03
Tissue Ingestion Total							2.E-02

2.E-02

TABLE 9.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	3.E-11	- -	2.E-12	3.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.00000008	0.000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.004	- -	0.0003	0.004
			1,4-Dichlorobenzene	1.E-09	- -	2.E-10	1.E-09	1,4-Dichlorobenzene	Liver	0.00003	- -	0.000007	0.00004
			Benzo(a)anthracene	9.E-08	- -	3.E-08	1.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-07	- -	3.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.002	0.008
			Benzo(b)fluoranthene	6.E-08	- -	2.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	3.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0005	- -	0.0001	0.0007
			Dibenzo(a,h)anthracene	2.E-07	- -	7.E-08	3.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-08	- -	2.E-08	7.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	7.E-09	- -	2.E-09	8.E-09	Dieldrin	Liver	0.00010	- -	0.00002	0.0001
			4,4'-DDT	2.E-10	- -	2.E-11	2.E-10	4,4'-DDT	Liver	0.00002	- -	0.000001	0.00002
			Heptachlor epoxide	2.E-08	- -	4.E-09	2.E-08	Heptachlor epoxide	Liver	0.002	- -	0.0004	0.002
			Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.07	- -	0.002	0.07
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.1	- -	0.02	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular	0.06	- -	0.007	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.004	- -	0.001	0.005
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.002	- -	0.007	0.009
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.003	0.007
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.006	0.3
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.001	- -	0.00003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.2	- -	0.006	0.2
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.04	- -	0.03	0.07
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.06	- -	0.04	0.1
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00004	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.001	0.003
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.04	- -	0.04	0.08
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.04	- -	0.0009	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.03	- -	0.0113	0.04
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0	1
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	3.E-10	- -	4.E-08	4.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	4.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-08	- -	1.E-06	1.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	1.E-06	- -	4.E-06	5.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	5.E-07	- -	1.E-06	2.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	1.E-08	- -	4.E-08	6.E-08	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	14	- -	3	17
	Exposure Medium Total						1.E-03						17

TABLE 9.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	2.E-09	- -	2.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	5.E-12	- -	5.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	3.E-13	- -	3.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-14	- -	2.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-12	- -	1.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	3.E-13	- -	3.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-14	- -	2.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	6.E-16	- -	6.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	4.E-14	- -	4.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-07	- -	2.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	9.E-08	- -	9.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-08	- -	3.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	7.E-12	- -	7.E-12	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	4.E-09	- -	4.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	4.E-08	- -	4.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	1.E-08	- -	1.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	5.E-14	- -	5.E-14	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-09	- -	2.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	5.E-15	- -	5.E-15	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	3.E-09	- -	3.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	3.E-13	- -	3.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	9.E-13	- -	9.E-13	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-10	- -	1.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	9.E-10	- -	9.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	7.E-11	- -	7.E-11	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	6.E-11	- -	6.E-11	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	2.E-11	- -	2.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						2.E-06						0.05
Soil Total							1.E-03						17
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	6.E-08	- -	6.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	6.E-08	--	6.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						6.E-08						0.009
Groundwater Total							6.E-08						0.009

TABLE 9.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	9.E-07	- -	4.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	6.E-08	- -	2.E-07	2.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-08	- -	2.E-07	2.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		0.7	--	0.06	0.7
	Exposure Medium Total						2.E-05						0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	8.E-07	- -	1.E-07	9.E-07	Arsenic	Skin, Vascular	0.02	- -	0.004	0.02
			Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	3.E-11	- -	2.E-07	2.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	8.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	8.E-10	- -	2.E-07	2.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	9.E-08	- -	3.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	8.E-09	- -	2.E-07	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	5.E-07	7.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	3.E-07	3.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-07	1.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-08	- -	2.E-07	3.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	6.E-06	1.E-05	Chemical Total		0.02	--	0.009	0.03
	Exposure Medium Total						1.E-05						0.03
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	6.E-07	- -	1.E-07	7.E-07	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.003	0.10
			Dioxin-like PCBs	6.E-07	- -	3.E-07	9.E-07	Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	4.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	1.E-10	- -	2.E-08	2.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	5.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.6	--	0.1	0.7
	Exposure Medium Total						1.E-04						0.7
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	1.E-07	- -	6.E-08	2.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	2.E-07	- -	8.E-08	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0085	0.03
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	4.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-08	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	1.E-07	- -	3.E-07	4.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	4.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		9	--	0.5	9
	Exposure Medium Total						2.E-05						9
Sediment Total							2.E-04						11

TABLE 9.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.0016	- -	0.006	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	1	1
			Radium-226	1.E-06	- -	1.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.10	--	1	1
	Exposure Medium Total						1.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0003	0.007
			Chromium (Hexavalent)	2.E-07	- -	8.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	1.E-10	- -	7.E-09	8.E-09	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	3.E-07	3.E-07	2,3,7,8-TCDD TEQ	Development	0.0004	- -	0.04	0.04
			Potassium-40	5.E-08	- -	7.E-12	5.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	5.E-07	--	1.E-06	2.E-06	Chemical Total		0.1	--	0.05	0.2
	Exposure Medium Total						2.E-06						0.2
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.004	0.09
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.002	- -	0.0001	0.002
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	1.E-08	- -	8.E-07	8.E-07	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.4	--	0.8	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							8.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 30

Total Neurological HI =	0.2
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.01
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.2
Total Adrenal Glands HI =	0.000001
Total Eyes HI =	9
Total Immune System HI =	9
Total Nails HI =	9
Total Longevity HI =	0.2
Total Kidneys HI =	0.05
Total Gastrointestinal Tract HI =	0.6
Total None Reported HI =	0.3
Total Thyroid HI =	10
Total Reproductive Effects HI =	0.004
Total Hair HI =	2
Total Teeth HI =	0.002
Total Development HI =	7
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.15
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-12	- -	3.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000009	0.0000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0005	- -	0.0003	0.0008
			1,4-Dichlorobenzene	2.E-10	- -	4.E-10	6.E-10	1,4-Dichlorobenzene	Liver	0.000004	- -	0.000009	0.00001
			Benzo(a)anthracene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-08	- -	2.E-07	3.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.002	0.003
			Benzo(b)fluoranthene	6.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	5.E-09	8.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00007	- -	0.0002	0.0002
			Dibenzo(a,h)anthracene	2.E-08	- -	6.E-08	8.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-09	- -	1.E-08	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	3.E-09	4.E-09	Dieldrin	Liver	0.00001	- -	0.00003	0.00004
			4,4'-DDT	5.E-11	- -	3.E-11	8.E-11	4,4'-DDT	Liver	0.000002	- -	0.000001	0.000003
			Heptachlor epoxide	3.E-09	- -	7.E-09	1.E-08	Heptachlor epoxide	Liver	0.0002	- -	0.0004	0.0006
			Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.010	- -	0.002	0.01
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.02	- -	0.03	0.05
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin/Vascular	0.008	- -	0.009	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0005	- -	0.001	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0003	- -	0.008	0.008
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.006	- -	0.005	0.011
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0004	- -	0.007	0.007
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.004	0.005
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.04	- -	0.008	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0002	- -	0.00004	0.0002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.03	- -	0.007	0.04
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.03	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.009	- -	0.04	0.05
			Selenium	NV	- -	NV	NV	Selenium	blood, teeth, skin, central nerv	0.0002	- -	0.00004	0.0003
			Silver	NV	- -	NV	NV	Silver	Skin	0.0003	- -	0.001	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.03	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.006	- -	0.05	0.05
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.005	- -	0.001	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0134	0.018
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0	0
			Bismuth-212	9.E-11	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	3.E-09	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	9.E-07	- -	6.E-06	6.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-07	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	4.E-07	- -	2.E-06	3.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	9.E-09	- -	6.E-08	7.E-08	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	6
	Exposure Medium Total						1.E-03						6

TABLE 9.15
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	3.E-09	- -	3.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	3.E-14	- -	3.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	9.E-13	- -	9.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	3.E-14	- -	3.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	9.E-16	- -	9.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	6.E-14	- -	6.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-07	- -	3.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-07	- -	1.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-08	- -	4.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	rdiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	1.E-11	- -	1.E-11	Beryllium	spiratory system, Immune syste	- -	0.000002	- -	0.000002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	4.E-10	- -	4.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	cardiovascular system, neurol	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	6.E-08	- -	6.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	2.E-13	- -	2.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	7.E-09	- -	7.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	1.E-14	- -	1.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	9.E-09	- -	9.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	8.E-13	- -	8.E-13	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	8.E-09	- -	8.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	3.E-12	- -	3.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	4.E-10	- -	4.E-10	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	3.E-09	- -	3.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	2.E-10	- -	2.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	2.E-10	- -	2.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	5.E-11	- -	5.E-11	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						3.E-06						0.05
Soil Total							1.E-03						6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	9.E-08	- -	9.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	9.E-08	--	9.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						9.E-08						0.009
Groundwater Total							9.E-08						0.009

TABLE 9.15
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	8.E-08	- -	3.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Arsenic	3.E-07	- -	4.E-07	7.E-07	Arsenic	Skin, Vascular	0.005	- -	0.007	0.01
			Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.02	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.01	- -	0.004	0.02
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.04	- -	0.01	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	3.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.03	0.1
			Radium-226	5.E-08	- -	2.E-07	3.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	2.E-08	- -	3.E-07	3.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total	--	0.09	--	0.07	0.2
	Exposure Medium Total						1.E-05						0.2
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	2.E-07	- -	2.E-07	4.E-07	Arsenic	Skin, Vascular	0.003	- -	0.004	0.007
			Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.006	0.007
			Bismuth-212	2.E-11	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	6.E-08	- -	4.E-07	4.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	6.E-10	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	7.E-08	- -	5.E-07	5.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	6.E-09	- -	3.E-07	3.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	1.E-07	- -	8.E-07	9.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-08	- -	4.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	6.E-08	- -	3.E-07	4.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	8.E-07	--	7.E-06	8.E-06	Chemical Total	--	0.003	--	0.01	0.01
	Exposure Medium Total						8.E-06						0.01
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0006	0.0008
			Arsenic	1.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.003	0.005
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.10	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.04	- -	0.01	0.06
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.004	0.02
			Dioxin-like PCBs	1.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-08	6.E-08	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.002	0.005
			Bismuth-212	3.E-11	- -	5.E-07	5.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	5.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	1.E-10	- -	3.E-08	3.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	8.E-10	- -	4.E-07	4.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	7.E-07	7.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-07	3.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	5.E-05	6.E-05	Chemical Total	--	0.08	--	0.2	0.2
	Exposure Medium Total						6.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0004	- -	0.002	0.002
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-07	- -	5.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.005	- -	0.02	0.02
			Aroclor 1260	3.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	2.E-07	- -	3.E-07	5.E-07	Arsenic	Skin, Vascular	0.004	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.006	0.006
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.001	- -	0.0003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.002	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.02	- -	0.2	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.02	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.01	0.01
			2,3,7,8-TCDD TEQ	4.E-08	- -	4.E-08	8.E-08	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.003	0.01
			Bismuth-212	3.E-11	- -	5.E-07	5.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	4.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	9.E-10	- -	4.E-07	4.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	7.E-07	7.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	8.E-08	- -	5.E-07	6.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	4.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-07	3.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total	--	1	--	0.5	2
	Exposure Medium Total						1.E-05						2
Sediment Total							9.E-05						2

TABLE 9.15
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	0.0004	- -	0.007	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.004	0.03
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Radium-226	1.E-06	- -	2.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total	--	0.03	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	4.E-08	- -	7.E-07	7.E-07	Chromium (Hexavalent)	None Reported	0.00009	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.007	0.04
			High Risk PCBs	6.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-09	- -	6.E-07	6.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.05	0.05
			Potassium-40	8.E-08	- -	1.E-11	8.E-08	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	2.E-07	--	1.E-06	2.E-06	Chemical Total	--	0.04	--	0.06	0.09
	Exposure Medium Total						2.E-06						0.09
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.005	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0006	- -	0.0001	0.001
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	0.8	0.8
			High Risk PCBs	6.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.1	0.1
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.1	--	0.9	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media	1.E-03
Total Hazard Index Across All Media	10

Total Neurological HI =	0.1
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.006
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.06
Total Adrenal Glands HI =	0.0000002
Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Longevity HI =	0.1
Total Kidneys HI =	0.02
Total Gastrointestinal Tract HI =	0.1
Total None Reported HI =	0.3
Total Thyroid HI =	2
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.4
Total Teeth HI =	0.0003
Total Development HI =	4
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	8.E-12	- -	1.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000001	0.0000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0003	- -	0.00004	0.0004
			1,4-Dichlorobenzene	3.E-10	- -	1.E-10	4.E-10	1,4-Dichlorobenzene	Liver	0.000003	- -	0.000001	0.000004
			Benzo(a)anthracene	6.E-09	- -	3.E-09	9.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0006	- -	0.0003	0.0009
			Benzo(b)fluoranthene	4.E-09	- -	2.E-09	6.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-09	- -	2.E-09	6.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00005	- -	0.00002	0.00007
			Dibenzo(a,h)anthracene	1.E-08	- -	7.E-09	2.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	3.E-09	- -	2.E-09	5.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	2.E-09	- -	9.E-10	3.E-09	Dieldrin	Liver	0.000009	- -	0.000004	0.00001
			4,4'-DDT	7.E-11	- -	9.E-12	8.E-11	4,4'-DDT	Liver	0.000001	- -	0.0000002	0.000002
			Heptachlor epoxide	5.E-09	- -	2.E-09	7.E-09	Heptachlor epoxide	Liver	0.0001	- -	0.00006	0.0002
			Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system	0.6	- -	0.4	1.0
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.007	- -	0.0003	0.007
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.01	- -	0.004	0.02
			Arsenic	7.E-07	- -	2.E-07	9.E-07	Arsenic	Skin/Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0003	- -	0.0002	0.0006
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0002	- -	0.001	0.001
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.0010	0.001
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0003	- -	0.0006	0.0009
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0001	- -	0.000005	0.0001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.02	- -	0.0009	0.02
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.004	- -	0.004	0.008
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.006	- -	0.006	0.01
			Selenium	NV	- -	NV	NV	Selenium	blood, teeth, skin, central nerve	0.0001	- -	0.000006	0.0002
			Silver	NV	- -	NV	NV	Silver	Skin	0.0002	- -	0.0002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.004	0.09
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.004	- -	0.007	0.01
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.003	- -	0.0001	0.004
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.003	- -	0.0019	0.005
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development	0.3	- -	0	0
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.09	- -	0.0	0.1
			Bismuth-212	2.E-10	- -	4.E-06	4.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	5.E-10	- -	1.E-07	1.E-07	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	6.E-09	- -	3.E-06	3.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	6.E-08	- -	4.E-06	4.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	2.E-06	- -	1.E-05	1.E-05	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Radium-228	3.E-07	- -	5.E-06	5.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-06	3.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	8.E-07	- -	5.E-06	6.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	2.E-08	- -	1.E-07	2.E-07	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						2.E-03						2

TABLE 9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions	1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	7.E-09	- -	7.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	9.E-11	- -	9.E-11	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	7.E-14	- -	7.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	8.E-13	- -	8.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-14	- -	6.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-15	- -	2.E-15	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-13	- -	1.E-13	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	6.E-07	- -	6.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-07	- -	3.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-08	- -	9.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-10	- -	3.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	2.E-11	- -	2.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	9.E-09	- -	9.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	1.E-07	- -	1.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	4.E-08	- -	4.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212	- -	3.E-13	- -	3.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	3.E-14	- -	3.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	2.E-12	- -	2.E-12	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	6.E-12	- -	6.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-09	- -	1.E-09	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	6.E-09	- -	6.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	5.E-10	- -	5.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	4.E-10	- -	4.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	1.E-10	- -	1.E-10	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	7.E-06	--	7.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						7.E-06						0.05
Soil Total							2.E-03						2
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	2.E-07	- -	2.E-07	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						2.E-07						0.009
Groundwater Total							2.E-07						0.009

TABLE 9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	4.E-07	- -	4.E-07	8.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	5.E-07	- -	3.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	1.E-07	- -	5.E-07	6.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	5.E-08	- -	7.E-07	7.E-07	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	5.E-06	6.E-06	Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total						6.E-06						0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	2.E-07	- -	2.E-07	5.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.004
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	4.E-11	- -	7.E-07	7.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	1.E-09	- -	6.E-07	6.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	1.E-06	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	8.E-07	8.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	6.E-08	- -	1.E-06	1.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	5.E-07	5.E-07	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	1.E-07	- -	8.E-07	9.E-07	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total		0.002	--	0.004	0.006
	Exposure Medium Total						1.E-05						0.006
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	2.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.009	- -	0.002	0.01
			Dioxin-like PCBs	2.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.007	- -	0.018	0.02
			2,3,7,8-TCDD TEQ	5.E-08	- -	2.E-08	7.E-08	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	6.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	1.E-07	- -	7.E-07	8.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	6.E-08	6.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	9.E-07	9.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	9.E-07	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	9.E-08	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	7.E-07	7.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	3.E-05	3.E-05	Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total						3.E-05						0.1

TABLE 9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	3.E-09	- -	7.E-09	1.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.001
			Benzo(b)fluoranthene	2.E-09	- -	6.E-09	8.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	6.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	4.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	5.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	3.E-07	- -	3.E-07	6.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	7.E-08	- -	4.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.004
			Bismuth-212	6.E-11	- -	1.E-06	1.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-09	- -	9.E-07	9.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	2.E-07	- -	1.E-06	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	8.E-08	- -	1.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	8.E-07	8.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						1.E-05						1
Sediment Total							6.E-05						1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	1.E-05	2.E-05	Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total						2.E-05						0.4
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	3.E-08	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	9.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.00008	- -	0.02	0.02
			Potassium-40	2.E-07	- -	2.E-11	2.E-07	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	4.E-07	--	8.E-07	1.E-06	Chemical Total		0.02	--	0.02	0.05
	Exposure Medium Total						1.E-06						0.05

TABLE 9.16
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.002	0.02
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0004	- -	0.00005	0.0005
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	9.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	7.E-06	- -	8.E-11	7.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	2.E-05	3.E-05	Chemical Total		0.08	--	0.4	0.4
	Exposure Medium Total						3.E-05						0.4
Surface Water Total							5.E-05						0.9

Total Risk Across All Media	2.E-03

Total Hazard Index Across All Media	4

Total Neurological HI =	0.07
Total Body and Organ Weight HI =	0.09
Total Liver HI =	0.005
Total Blood HI =	0.03
Total Skin/Vascular HI =	0.03
Total Adrenal Glands HI =	0.0000001
Total Eyes HI =	1
Total Immune System HI =	1
Total Nails HI =	1
Total Longevity HI =	1
Total Kidneys HI =	0.008
Total Gastrointestinal Tract HI =	0.06
Total None Reported HI =	0.1
Total Thyroid HI =	1
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.2
Total Teeth HI =	0.0002
Total Development HI =	1
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.17

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.02	- -	0.02
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.05	- -	0.05
			Vinyl Chloride	- -	2.E-06	- -	2.E-06	Vinyl Chloride	Liver	- -	0.01	- -	0.01
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						2.E-06						0.08
Groundwater Total							2.E-06						0.08

Total Risk Across All Media: 2.E-06

Total Hazard Index Across All Media: 0.08

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-13	- -	4.E-14	5.E-13	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.0000001	0.000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.005	- -	0.0005	0.005
			1,4-Dichlorobenzene	2.E-11	- -	5.E-12	2.E-11	1,4-Dichlorobenzene	Liver	0.00004	- -	0.00001	0.00005
			Benzo(a)anthracene	3.E-10	- -	1.E-10	4.E-10	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	3.E-09	- -	1.E-09	4.E-09	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	2.E-10	- -	8.E-11	3.E-10	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	2.E-10	- -	7.E-11	3.E-10	Bis(2-ethylhexyl)phthalate	Liver	0.0007	- -	0.0002	0.0010
			Dibenzo(a,h)anthracene	7.E-10	- -	3.E-10	1.E-09	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	2.E-10	- -	7.E-11	2.E-10	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-10	- -	4.E-11	2.E-10	Dieldrin	Liver	0.0001	- -	0.00004	0.0002
			4,4'-DDT	4.E-12	- -	4.E-13	4.E-12	4,4'-DDT	Liver	0.00002	- -	0.000002	0.00002
			Heptachlor epoxide	3.E-10	- -	9.E-11	4.E-10	Heptachlor epoxide	Liver	0.002	- -	0.0007	0.003
			Aroclor 1248	6.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-07	- -	2.E-07	5.E-07	Aroclor 1254	Eyes, nails, immune system	9	- -	4	12
			Aroclor 1260	2.E-07	- -	8.E-08	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	5.E-06	- -	2.E-06	7.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.10	- -	0.003	0.1
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.2	- -	0.04	0.2
			Arsenic	4.E-08	- -	6.E-09	5.E-08	Arsenic	Skin/Vascular	0.08	- -	0.01	0.09
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.007
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.003	- -	0.01	0.01
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.06	- -	0.007	0.07
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	8.E-09	- -	1.E-08	2.E-08	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.01	0.4
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.002	- -	0.00006	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.3	- -	0.01	0.3
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.05	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.08	- -	0.07	0.2
			Selenium	NV	- -	NV	NV	Selenium	lood, teeth, skin, central nerv	0.002	- -	0.00007	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.003	- -	0.002	0.005
			Thallium	NV	- -	NV	NV	Thallium	Hair	1	- -	0.04	1
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.06	- -	0.07	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.05	- -	0.002	0.05
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.04	- -	0.021	0.07
			Dioxin-like PCBs	4.E-07	- -	2.E-07	6.E-07	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	1.E-07	- -	1.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	1	- -	0	1
			Bismuth-212	3.E-12	- -	1.E-07	1.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-06	- -	2.E-05	2.E-05	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-11	- -	4.E-09	4.E-09	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	3.E-06	- -	2.E-08	3.E-06	Lead-210	NA	NV	- -	NV	NV
			Lead-212	7.E-11	- -	1.E-07	1.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-06	- -	3.E-05	3.E-05	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	9.E-10	- -	1.E-07	1.E-07	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	4.E-08	- -	4.E-07	5.E-07	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	5.E-07	- -	5.E-06	6.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	5.E-09	- -	2.E-07	2.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	9.E-08	9.E-08	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	2.E-08	- -	2.E-07	2.E-07	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	4.E-10	- -	5.E-09	5.E-09	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	- -	6.E-05	7.E-05	Chemical Total	- -	18	- -	6	24
	Exposure Medium Total						7.E-05						24

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.00002	- -	0.00002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.02	- -	0.02
			1,4-Dichlorobenzene	- -	2.E-10	- -	2.E-10	1,4-Dichlorobenzene	Liver	- -	0.00002	- -	0.00002
			Benzo(a)anthracene	- -	3.E-12	- -	3.E-12	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	1.E-13	- -	1.E-13	Benzo(a)pyrene	Fetotoxicity	- -	0.00007	- -	0.00007
			Benzo(b)fluoranthene	- -	7.E-15	- -	7.E-15	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-15	- -	2.E-15	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	3.E-14	- -	3.E-14	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	6.E-15	- -	6.E-15	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-15	- -	2.E-15	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	7.E-17	- -	7.E-17	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	5.E-15	- -	5.E-15	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-08	- -	2.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-09	- -	3.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-07	- -	2.E-07	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.001	- -	0.001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-11	- -	1.E-11	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0002	- -	0.0002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.0001	- -	0.0001
			Beryllium	- -	8.E-13	- -	8.E-13	Beryllium	Respiratory system, Immune system	- -	0.00002	- -	0.00002
			Cadmium	- -	7.E-12	- -	7.E-12	Cadmium	Kidneys	- -	0.0003	- -	0.0003
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	8.E-11	- -	8.E-11	Chromium (Hexavalent)	Respiratory System	- -	0.000009	- -	0.000009
			Cobalt	- -	3.E-10	- -	3.E-10	Cobalt	Respiratory System	- -	0.005	- -	0.005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00000008	- -	0.00000008
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.002	- -	0.002
			Nickel	- -	3.E-11	- -	3.E-11	Nickel	Respiratory System	- -	0.001	- -	0.001
			Selenium	- -	NV	- -	NV	Selenium	cardiovascular system, neurol	- -	0.00000003	- -	0.00000003
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.0002	- -	0.0002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.4	- -	0.4
			Dioxin-like PCBs	- -	5.E-09	- -	5.E-09	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	- -	1.E-09	- -	1.E-09	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0008	- -	0.0008
			Bismuth-212	- -	4.E-13	- -	4.E-13	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	4.E-14	- -	4.E-14	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	2.E-12	- -	2.E-12	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	7.E-12	- -	7.E-12	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	1.E-09	- -	1.E-09	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	7.E-09	- -	7.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	6.E-10	- -	6.E-10	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	5.E-10	- -	5.E-10	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	1.E-10	- -	1.E-10	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	3.E-07	--	3.E-07	Chemical Total		--	0.4	--	0.4
	Exposure Medium Total						3.E-07						0.4
Soil Total							7.E-05						25
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV		NV	Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Utility Trench	Aluminum	- -	- -	NV	NV	Aluminum	Neurological	- -	- -	0.0001	0.0001
			Antimony	- -	- -	NV	NV	Antimony	Blood, Longevity	- -	- -	0.04	0.04
			Arsenic	- -	- -	3.E-09	3.E-09	Arsenic	Skin, Vascular	- -	- -	0.01	0.01
			Barium	- -	- -	NV	NV	Barium	Kidneys	- -	- -	0.003	0.003
			Cadmium	- -	- -	NV	NV	Cadmium	Kidneys	- -	- -	0.004	0.004
			Chromium (Trivalent)	- -	- -	NV	NV	Chromium (Trivalent)	None Reported	- -	- -	0.00003	0.00003
			Chromium (Hexavalent)	- -	- -	7.E-08	7.E-08	Chromium (Hexavalent)	None Reported	- -	- -	0.04	0.04
			Cobalt	- -	- -	NV	NV	Cobalt	Thyroid	- -	- -	0.01	0.01
			Iron	- -	- -	NV	NV	Iron	Gastrointestinal Tract	- -	- -	0.003	0.003
			Manganese	- -	- -	NV	NV	Manganese	Neurological	- -	- -	0.05	0.05
			Mercury	- -	- -	NV	NV	Mercury	Development, Neurological	- -	- -	0.0002	0.0002
			Nickel	- -	- -	NV	NV	Nickel	Body and Organ Weights	- -	- -	0.003	0.003
			Selenium	- -	- -	NV	NV	Selenium	blood, teeth, skin, central nerv	- -	- -	0.0002	0.0002
			Thallium	- -	- -	NV	NV	Thallium	Hair	- -	- -	0.1	0.1
			Vanadium	- -	- -	NV	NV	Vanadium	Hair	- -	- -	0.003	0.003
			Naphthalene	- -	- -	NV	NV	Naphthalene	Blood and immune system	- -	- -	0.0004	0.0004
			Chlorobenzene	- -	- -	NV	NV	Chlorobenzene	Liver	- -	- -	0.008	0.008
			cis-1,2-Dichloroethene	- -	- -	NV	NV	cis-1,2-Dichloroethene	Kidneys	- -	- -	0.005	0.005
			Vinyl chloride	- -	- -	3.E-09	3.E-09	Vinyl chloride	Liver	- -	- -	0.001	0.001
			1,4-Dichlorobenzene	- -	- -	9.E-11	9.E-11	1,4-Dichlorobenzene	Liver	- -	- -	0.0002	0.0002
			Cyanide	- -	- -	NV	NV	Cyanide	Reproductive Effects	- -	- -	0.003	0.003
			Dioxin-Like PCBs	- -	- -	8.E-09	8.E-09	Dioxin-Like PCBs	Development	- -	- -	0.08	0.08
			High Risk PCBs	- -	- -	1.E-08	1.E-08	High Risk PCBs	NA	- -	- -	NV	NV
			2,3,7,8-TCDD TEQ	- -	- -	1.E-07	1.E-07	2,3,7,8-TCDD TEQ	Development	- -	- -	1	1
			Bismuth-214	- -	- -	1.E-13	1.E-13	Bismuth-214	NA	- -	- -	NV	NV
			Lead-210	- -	- -	4.E-16	4.E-16	Lead-210	NA	- -	- -	NV	NV
			Lead-212	- -	- -	3.E-14	3.E-14	Lead-212	NA	- -	- -	NV	NV
			Lead-214	- -	- -	9.E-14	9.E-14	Lead-214	NA	- -	- -	NV	NV
			Potassium-40	- -	- -	4.E-14	4.E-14	Potassium-40	NA	- -	- -	NV	NV
			Radium-226	- -	- -	1.E-12	1.E-12	Radium-226	NA	- -	- -	NV	NV
			Radium-228	- -	- -	9.E-14	9.E-14	Radium-228	NA	- -	- -	NV	NV
			Strontium-90	- -	- -	4.E-17	4.E-17	Strontium-90	NA	- -	- -	NV	NV
			Chemical Total	--	--	2.E-07	2.E-07	Chemical Total		--	--	2	2
	Exposure Medium Total						2.E-07						2
Groundwater Total							2.E-07						23
Sediment	Northern Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	3.E-09	- -	1.E-09	4.E-09	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Arsenic	2.E-08	- -	3.E-09	3.E-08	Arsenic	Skin, Vascular	0.04	- -	0.007	0.05
			Chromium (Hexavalent)	2.E-08	- -	3.E-08	5.E-08	Chromium (Hexavalent)	None Reported	0.01	- -	0.02	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.004	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-09	3.E-08	2,3,7,8-TCDD TEQ	Development	0.3	- -	0.03	0.3
			Radium-226	2.E-09	- -	2.E-08	2.E-08	Radium-226	NA	NV	- -	NV	NV
			Radium-228	8.E-10	- -	2.E-08	2.E-08	Radium-228	NA	NV	- -	NV	NV
			Chemical Total	8.E-08	--	8.E-08	2.E-07	Chemical Total		0.9	--	0.07	1
	Exposure Medium Total						2.E-07						1
	Northern Drainage Channel Sediment	Volatile and Fugitive Dust Emissions	Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0003	- -	0.0003
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.1	- -	0.1
			2,3,7,8-TCDD TEQ	- -	1.E-09	- -	1.E-09	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.001	- -	0.001
			Chemical Total	--	4.E-09	--	4.E-09	Chemical Total		--	0.1	--	0.1
	Exposure Medium Total						4.E-09						0.1

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	1.E-08	- -	2.E-09	2.E-08	Arsenic	Skin, Vascular	0.03	- -	0.004	0.03
			Chromium (Hexavalent)	8.E-09	- -	1.E-08	2.E-08	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Bismuth-212	6.E-13	- -	2.E-08	2.E-08	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	3.E-09	- -	3.E-08	3.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-11	- -	2.E-08	2.E-08	Lead-212	NA	NV	- -	NV	NV
			Lead-214	3.E-09	- -	3.E-08	4.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	2.E-10	- -	3.E-08	3.E-08	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	7.E-09	- -	6.E-08	6.E-08	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-09	- -	3.E-08	3.E-08	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-08	2.E-08	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	3.E-09	- -	3.E-08	3.E-08	Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	4.E-08	--	3.E-07	3.E-07	Chemical Total		0.03	--	0.01	0.04
	Exposure Medium Total						3.E-07						0.04
	Freshwater Wetland Sediment	Volatile and Fugitive Dust Emissions	Arsenic	- -	5.E-11	- -	5.E-11	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.001	- -	0.001
			Chromium (Hexavalent)	- -	1.E-09	- -	1.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.002	- -	0.002
			Bismith-212	--	2.E-14	--	2.E-14	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	6.E-12	- -	6.E-12	Bismuth-214	NA	- -	NV	- -	NV
			Lead-212	- -	1.E-13	- -	1.E-13	Lead-210	NA	- -	NV	- -	NV
			Lead-214	- -	7.E-12	- -	7.E-12	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	--	4.E-13	--	4.E-13	Potassium-40	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-11	- -	2.E-11	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	3.E-11	- -	3.E-11	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	--	NV	--	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	--	2.E-11	- -	2.E-11	Thorium-234	NA	- -	NV	- -	NV
			Chemical Total	--	1.E-09	--	1.E-09	Chemical Total		--	0.003	--	0.003
	Exposure Medium Total						1.E-09						0.003
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	5.E-10	- -	2.E-10	7.E-10	Benzo(a)pyrene	Neurological	0.002	- -	0.0006	0.002
			Arsenic	1.E-08	- -	2.E-09	1.E-08	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.08	- -	0.1	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.4	- -	0.01	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.004	0.1
			Dioxin-like PCBs	1.E-08	- -	5.E-09	1.E-08	Dioxin-like PCBs	Development	0.1	- -	0.05	0.1
			2,3,7,8-TCDD TEQ	3.E-09	- -	2.E-10	3.E-09	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.002	0.03
			Bismuth-212	9.E-13	- -	4.E-08	4.E-08	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-09	- -	2.E-08	2.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	1.E-11	- -	2.E-09	2.E-09	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-11	- -	3.E-08	3.E-08	Lead-212	NA	NV	- -	NV	NV
			Lead-214	3.E-09	- -	3.E-08	3.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-10	- -	5.E-08	5.E-08	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	1.E-09	- -	5.E-08	5.E-08	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-08	2.E-08	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	2.E-07	--	4.E-07	6.E-07	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						6.E-07						1
Sediment	Paradise Creek Sediment	Volatile and Fugitive Dust Emissions	Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Cobalt		9.E-10		9.E-10	Cobalt	Respiratory System	- -	0.02	- -	0.02
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.1	- -	0.07
			Chemical Total	--	9.E-10	--	9.E-10	Chemical Total		--	0.1	--	0.1
	Exposure Medium Total						9.E-10						0.1

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	2.E-10	- -	7.E-11	2.E-10	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-09	- -	6.E-10	2.E-09	Benzo(a)pyrene	Neurological	0.004	- -	0.002	0.006
			Benzo(b)fluoranthene	1.E-10	- -	6.E-11	2.E-10	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	3.E-09	- -	1.E-09	5.E-09	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	9.E-09	- -	4.E-09	1.E-08	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-09	- -	9.E-10	3.E-09	Aroclor 1254	Eyes, Nails, Immune System	0.05	- -	0.02	0.07
			Aroclor 1260	3.E-09	- -	1.E-09	4.E-09	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.07	- -	0.02	0.09
			Arsenic	2.E-08	- -	3.E-09	2.E-08	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-08	- -	2.E-08	4.E-08	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	11	- -	0.3	11
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.01	- -	0.0004	0.01
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.2	- -	0.2	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.5	- -	0.02	0.5
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0103	0.03
			2,3,7,8-TCDD TEQ	4.E-09	- -	3.E-10	4.E-09	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.003	0.04
			Bismuth-212	9.E-13	- -	4.E-08	4.E-08	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-09	- -	2.E-08	2.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-11	- -	3.E-08	3.E-08	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-09	- -	3.E-08	3.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	4.E-10	- -	5.E-08	5.E-08	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	4.E-09	- -	4.E-08	4.E-08	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-09	- -	5.E-08	5.E-08	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	3.E-08	3.E-08	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	7.E-08	--	3.E-07	4.E-07	Chemical Total		12	--	0.6	12
	Exposure Medium Total						4.E-07						12
Sediment	Estuarine Wetland Sediment	Volatile and Fugitive Dust Emissions	Aroclor 1248	- -	9.E-10	- -	9.E-10	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-10	- -	1.E-10	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	1.E-10	- -	1.E-10	Aroclor 1260	NA	- -	NV	- -	NV
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0002	- -	0.0002
			Cobalt	- -	2.E-08	- -	2.E-08	Cobalt	Respiratory System	- -	0.4	- -	0.4
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.03	- -	0.03
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	1	- -	1
			Chemical Total	--	3.E-08	--	3.E-08	Chemical Total		--	1	--	1
	Exposure Medium Total						3.E-08						1
Sediment Total							1.E-06						16
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	6.E-10	- -	4.E-10	1.E-09	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	4.E-10	- -	2.E-08	3.E-08	Chromium (Hexavalent)	None Reported	0.0003	- -	0.01	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0010	- -	0.0007	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.009	0.02
			2,3,7,8-TCDD TEQ	1.E-10	- -	1.E-07	1.E-07	2,3,7,8-TCDD TEQ	Development	0.001	- -	1	1
			Radium-226	8.E-10	- -	1.E-13	8.E-10	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-09	--	2.E-07	2.E-07	Chemical Total		0.02	--	2	2
	Exposure Medium Total						2.E-07						2
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	6.E-10	- -	4.E-10	9.E-10	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	8.E-11	- -	5.E-09	5.E-09	Chromium (Hexavalent)	None Reported	0.00005	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00006	- -	0.00005	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.01	0.03
			High Risk PCBs	3.E-13	- -	2.E-10	2.E-10	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-12	- -	7.E-09	7.E-09	2,3,7,8-TCDD TEQ	Development	0.00007	- -	0.07	0.07
			Potassium-40	4.E-11	- -	6.E-14	4.E-11	Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	7.E-10	--	1.E-08	1.E-08	Chemical Total		0.02	--	0.09	0.1
	Exposure Medium Total						1.E-08						0.1

TABLE 9.18
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	6.E-10	- -	4.E-10	1.E-09	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	4.E-09	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.003	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.05	- -	0.01	0.07
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00008	- -	0.00006	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.010	0.02
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0004	- -	0.0002	0.0006
			Dioxin-Like PCBs	4.E-11	- -	1.E-07	1.E-07	Dioxin-Like PCBs	Development	0.0004	- -	1	1
			High Risk PCBs	3.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-11	- -	1.E-08	1.E-08	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.1	0.1
			Radium-226	2.E-09	- -	2.E-13	2.E-09	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	7.E-09	--	4.E-07	4.E-07	Chemical Total		0.1	--	1	1
	Exposure Medium Total						4.E-07						1
Surface Water Total							6.E-07						3

Total Risk Across All Media: 8.E-05

Total Hazard Index Across All Media: 67

Total Neurological HI =	2
Total Body and Organ Weight HI =	0.5
Total Liver HI =	0.05
Total Blood HI =	0.4
Total Skin/Vascular HI =	0.3
Total Adrenal Glands HI =	0.000002
Total Eyes HI =	12
Total Immune System HI =	13
Total Nails HI =	12
Total Longevity HI =	0.4
Total Kidneys HI =	0.1
Total Gastrointestinal Tract HI =	0.8
Total None Reported HI =	0.5
Total Thyroid HI =	35
Total Reproductive Effects HI =	0.01
Total Hair HI =	3
Total Teeth HI =	0.002
Total Development HI =	12
Total Urinary Tract HI =	0.00002
Total Fetotoxicity HI =	0.0002
Total Cardiovascular System HI =	0.0008
Total Respiratory System HI =	0.4
Total Endocrine System HI =	0.004

TABLE 9.19
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	6.E-12	- -	5.E-13	6.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.0000001	0.000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.005	- -	0.0005	0.005
			1,4-Dichlorobenzene	2.E-10	- -	7.E-11	3.E-10	1,4-Dichlorobenzene	Liver	0.00004	- -	0.00001	0.00005
			Benzo(a)anthracene	4.E-09	- -	2.E-09	5.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	3.E-08	- -	1.E-08	5.E-08	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	3.E-09	- -	1.E-09	4.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	9.E-10	4.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.0007	- -	0.0002	0.0009
			Dibenzo(a,h)anthracene	9.E-09	- -	4.E-09	1.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	2.E-09	- -	9.E-10	3.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	5.E-10	2.E-09	Dieldrin	Liver	0.0001	- -	0.00004	0.0002
			4,4'-DDT	5.E-11	- -	5.E-12	5.E-11	4,4'-DDT	Liver	0.00002	- -	0.000002	0.00002
			Heptachlor epoxide	3.E-09	- -	1.E-09	4.E-09	Heptachlor epoxide	Liver	0.002	- -	0.0006	0.003
			Aroclor 1248	7.E-06	- -	3.E-06	1.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	2.E-06	7.E-06	Aroclor 1254	Eyes, nails, immune system	8	- -	4	12
			Aroclor 1260	2.E-06	- -	1.E-06	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05		3.E-05	9.E-05	High Risk PCB Congeners	NA	NV		NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.09	- -	0.03	0.1
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.2	- -	0.04	0.2
			Arsenic	5.E-07	- -	3.E-08	5.E-07	Arsenic	Skin/Vascular	0.08	- -	0.004	0.08
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.007	0.01
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.003	- -	0.01	0.01
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.06	- -	0.07	0.13
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.001	0.005
			Chromium (Hexavalent)	1.E-07	- -	1.E-07	2.E-07	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.01	0.4
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.002	- -	0.00006	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.3	- -	0.010	0.3
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.05	- -	0.04	0.10
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.08	- -	0.06	0.1
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00007	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.002	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	1	- -	0.04	1
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.06	- -	0.07	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.05	- -	0.002	0.05
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.04	- -	0.020	0.06
			Dioxin-like PCBs	5.E-06	- -	2.E-06	7.E-06	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	2.E-06	- -	1.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	1	- -	0.1	1
			Bismuth-212	4.E-11	- -	2.E-06	2.E-06	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	3.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	2.E-10	- -	5.E-08	5.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-210	4.E-05	- -	2.E-07	4.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	9.E-10	- -	1.E-06	1.E-06	Lead-212	NA	NV	- -	NV	NV
			Lead-214	3.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	1.E-08	- -	2.E-06	2.E-06	Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	6.E-07	- -	5.E-06	6.E-06	Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	7.E-06	- -	7.E-05	7.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	6.E-08	- -	2.E-06	2.E-06	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	1.E-06	1.E-06	Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	2.E-07	- -	2.E-06	2.E-06	Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	5.E-09	- -	6.E-08	7.E-08	Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	7.E-04	9.E-04	Chemical Total	- -	17	- -	6	23
	Exposure Medium Total						9.E-04						23

TABLE 9.19
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.0002	- -	0.0002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.2	- -	0.2
			1,4-Dichlorobenzene	- -	3.E-08	- -	3.E-08	1,4-Dichlorobenzene	Liver	- -	0.0002	- -	0.0002
			Benzo(a)anthracene	- -	4.E-10	- -	4.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	4.E-10	- -	4.E-10	Benzo(a)pyrene	Fetotoxicity	- -	0.02	- -	0.02
			Benzo(b)fluoranthene	- -	3.E-11	- -	3.E-11	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-12	- -	9.E-12	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-10	- -	1.E-10	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-11	- -	2.E-11	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	8.E-12	- -	8.E-12	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	3.E-13	- -	3.E-13	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	2.E-11	- -	2.E-11	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-06	- -	2.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-06	- -	1.E-06	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-07	- -	4.E-07	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-05	- -	2.E-05	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.3	- -	0.3
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-08	- -	4.E-08	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.05	- -	0.05
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.03	- -	0.03
			Beryllium	- -	3.E-09	- -	3.E-09	Beryllium	Respiratory system, Immune system	- -	0.005	- -	0.005
			Cadmium	- -	3.E-08	- -	3.E-08	Cadmium	Kidneys	- -	0.1	- -	0.1
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-07	- -	3.E-07	Chromium (Hexavalent)	Respiratory System	- -	0.003	- -	0.003
			Cobalt	- -	1.E-06	- -	1.E-06	Cobalt	Respiratory System	- -	1	- -	1
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00002	- -	0.00002
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.5	- -	0.5
			Nickel	- -	1.E-07	- -	1.E-07	Nickel	Respiratory System	- -	0.3	- -	0.3
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000009	- -	0.000009
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.05	- -	0.05
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	6	- -	6
			Dioxin-like PCBs	- -	6.E-07	- -	6.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	NV	- -	NV
			2,3,7,8-TCDD TEQ	- -	2.E-07	- -	2.E-07	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	NV	- -	NV
			Bismuth-212	- -	1.E-10	- -	1.E-10	Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	- -	6.E-06	- -	6.E-06	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	- -	1.E-11	- -	1.E-11	Cesium-137	NA	- -	NV	- -	NV
			Lead-210	- -	8.E-06	- -	8.E-06	Lead-210	NA	- -	NV	- -	NV
			Lead-212	- -	7.E-10	- -	7.E-10	Lead-212	NA	- -	NV	- -	NV
			Lead-214	- -	7.E-06	- -	7.E-06	Lead-214	NA	- -	NV	- -	NV
			Potassium-40	- -	2.E-09	- -	2.E-09	Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	- -	4.E-07	- -	4.E-07	Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-06	- -	2.E-06	Radium-226	NA	- -	NV	- -	NV
			Radium-228	- -	2.E-07	- -	2.E-07	Radium-228	NA	- -	NV	- -	NV
			Thallium-208	- -	NV	- -	NV	Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	- -	1.E-07	- -	1.E-07	Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	- -	4.E-08	- -	4.E-08	Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	5.E-05	--	5.E-05	Chemical Total	--	--	9	--	9
	Exposure Medium Total						5.E-05						9
Soil Total							1.E-03						33

TABLE 9.19
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV		NV	Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22
Groundwater Total							0.E+00						22

Total Risk Across All Media	1.E-03
Total Hazard Index Across All Media	54

Total Neurological HI =	7
Total Body and Organ Weight HI =	0.1
Total Liver HI =	0.2
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.1
Total Adrenal Glands HI =	0.000002
Total Eyes HI =	12
Total Immune System HI =	12
Total Nails HI =	12
Total Longevity HI =	0.2
Total Kidneys HI =	0.4
Total Gastrointestinal Tract HI =	0.7
Total None Reported HI =	0.02
Total Thyroid HI =	23
Total Reproductive Effects HI =	0.002
Total Hair HI =	1
Total Teeth HI =	0.002
Total Development HI =	7
Total Urinary Tract HI =	0.0002
Total Fetotoxicity HI =	0.06
Total Cardiovascular System HI =	0.05
Total Respiratory System HI =	2

TABLE 9.20
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (90-Day Dock Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	4.E-09	- -	2.E-09	6.E-09	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.004
			Arsenic	9.E-08	- -	1.E-08	1.E-07	Arsenic	Skin, Vascular	0.04	- -	0.006	0.05
			Chromium (Hexavalent)	1.E-06	- -	1.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.2	- -	0.2	0.4
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.8	- -	0.03	0.9
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.008	0.3
			Dioxin-like PCBs	9.E-08	- -	4.E-08	1.E-07	Dioxin-like PCBs	Development	0.2	- -	0.09	0.3
			2,3,7,8-TCDD TEQ	2.E-08	- -	2.E-09	2.E-08	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.005	0.06
			Bismuth-212	8.E-12	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	9.E-11	- -	2.E-08	2.E-08	Cesium-137	NA	NV	- -	NV	NV
			Lead-212	2.E-10	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-09	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-228	1.E-08	- -	5.E-07	5.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	1.E-06	- -	4.E-06	5.E-06	Chemical Total	- -	2	- -	0.3	2
	Exposure Medium Total						5.E-06						2
Sediment	Paradise Creek Sediment	Volatile and Fugitive Dust Emissions	Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.04	- -	0.04
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	- -	8.E-09	- -	8.E-09	Chemical Total	- -	- -	0.2	- -	0.2
	Exposure Medium Total						8.E-09						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	2.E-09	- -	7.E-10	2.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-08	- -	5.E-09	2.E-08	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	1.E-09	- -	5.E-10	2.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	3.E-08	- -	1.E-08	4.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	8.E-08	- -	4.E-08	1.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	8.E-09	3.E-08	Aroclor 1254	Eyes, Nails, Immune System	0.09	- -	0.04	0.1
			Aroclor 1260	2.E-08	- -	1.E-08	3.E-08	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.2
			Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.07	- -	0.01	0.08
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.005	- -	0.01	0.02
			Chromium (Hexavalent)	2.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.02	- -	0.03	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	21	- -	0.7	22
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0007	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.1	- -	0.003	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.4	- -	0.3	0.7
			Thallium	NV	- -	NV	NV	Thallium	Hair	1.0	- -	0.03	1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.04	- -	0.001	0.05
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-09	4.E-08	2,3,7,8-TCDD TEQ	Development	0.07	- -	0.007	0.08
			Bismuth-212	8.E-12	- -	3.E-07	3.E-07	Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	2.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	2.E-10	- -	3.E-07	3.E-07	Lead-212	NA	NV	- -	NV	NV
			Lead-214	2.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	3.E-09	- -	5.E-07	5.E-07	Potassium-40	NA	NV	- -	NV	NV
			Radium-226	3.E-08	- -	3.E-07	4.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	1.E-08	- -	4.E-07	4.E-07	Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NV	- -	2.E-07	2.E-07	Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	6.E-07	- -	3.E-06	3.E-06	Chemical Total	- -	23	- -	1	24
	Exposure Medium Total						3.E-06						24

TABLE 9.20
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (90-Day Dock Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Air	Volatile and Fugitive Dust Emissions	Aroclor 1248	- -	8.E-09	- -	8.E-09	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-09	- -	1.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	1.E-09	- -	1.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-08	- -	2.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.001	- -	0.001
			Cobalt	- -	2.E-07	- -	2.E-07	Cobalt	Respiratory System	- -	1	- -	1
			Nickel	- -	7.E-09	- -	7.E-09	Nickel	Respiratory System	- -	0.1	- -	0.1
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	3	- -	3
			Chemical Total	- -	2.E-07	- -	2.E-07	Chemical Total	- -	- -	4	- -	4
	Exposure Medium Total						2.E-07						4
Sediment Total							9.E-06						30

Total Risk Across All Media: 9.E-06

Total Hazard Index Across All Media: 30

Total Neurological HI =	3
Total Body and Organ Weight HI =	0.7
Total Blood HI =	0.2
Total Skin/Vascular HI =	0.1
Total Eyes HI =	0.1
Total Immune System HI =	0.2
Total Nails HI =	0.1
Total Longevity HI =	0.2
Total Gastrointestinal Tract HI =	0.1
Total None Reported HI =	0.4
Total Thyroid HI =	23
Total Hair HI =	1
Total Development HI =	0.4
Total Respiratory System HI =	1

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	Adrenal glands	0.00001	- -	0.0000004	0.000007
			Chlorobenzene	Liver	0.02	- -	0.002	0.02
			1,4-Dichlorobenzene	Liver	0.0002	- -	0.00004	0.0002
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.04	- -	0.01	0.05
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.003	- -	0.0007	0.004
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	Liver	0.0006	- -	0.0001	0.0007
			4,4'-DDT	Liver	0.00009	- -	0.000006	0.00010
			Heptachlor epoxide	Liver	0.009	- -	0.002	0.01
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	37	- -	12	49
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.4	- -	0.010	0.4
			Antimony	Blood and longevity	0.9	- -	0.1	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Barium	Kidneys	0.02	- -	0.007	0.03
			Beryllium	Gastrointestinal Tract	0.01	- -	0.04	0.05
			Cadmium	Kidneys	0.3	- -	0.02	0.3
			Chromium (Total)	None Reported	0.02	- -	0.03	0.05
			Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.04	2
			Cyanide	Reproductive effects	0.008	- -	0.0002	0.008
			Iron	Gastrointestinal Tract	1	- -	0.03	1
			Manganese	Neurological	0.2	- -	0.1	0.4
			Nickel	Body and Organ weights	0.4	- -	0.2	0.6
			Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.009	- -	0.0002	0.009
			Silver	Skin	0.01	- -	0.007	0.02
			Thallium	Hair	5	- -	0.1	5
			Vanadium	Hair	0.3	- -	0.2	0.5
			Zinc	Blood and immune system	0.2	- -	0.005	0.2
			Mercury	Autoimmune effects	0.2	- -	0.066	0.3
			Dioxin-like PCBs	Development	18	- -	6	24
			2,3,7,8-TCDD TEQ	Development	5	- -	0	6
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	- -	79	- -	20	99
	Exposure Medium Total							99

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions						
			1,2,4-Trichlorobenzene	Urinary tract	- -	0.00010	- -	0.00010
			Chlorobenzene	Liver, kidneys	- -	0.09	- -	0.09
			1,4-Dichlorobenzene	Liver	- -	0.00010	- -	0.00010
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0003	- -	0.0003
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.005	- -	0.005
			Antimony	NA	- -	NV	- -	NV
			Arsenic	ht, Cardiovascular system, Nervous system	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0005	- -	0.0005
			Beryllium	Respiratory system, Immune system	- -	0.00006	- -	0.00006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.00003	- -	0.00003
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Cyanide	Thyroid	- -	0.0000003	- -	0.0000003
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.007	- -	0.007
			Nickel	Respiratory System	- -	0.004	- -	0.004
			Selenium	Liver, cardiovascular system, neurological	- -	0.0000001	- -	0.0000001
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0007	- -	0.0007
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	2	- -	2
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.01	- -	0.01
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA	- -	NV	- -	NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	NA	- -	NV	- -	NV
			Chemical Total	--	--	2	--	2
	Exposure Medium Total							2
Soil Total								101

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.04	- -	0.0002	0.04
			Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Barium	Kidneys	0.08	- -	0.005	0.09
			Cadmium	Kidneys	0.07	- -	0.007	0.08
			Chromium (Trivalent)	None Reported	0.0001	- -	0.00005	0.0002
			Chromium (Hexavalent)	None Reported	0.2	- -	0.07	0.3
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Mercury	Autoimmune Effects	0.08	- -	0.0004	0.09
			Nickel	Body and Organ Weights	0.05	- -	0.001	0.05
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.08	- -	0.0004	0.08
			Thallium	Hair	52	- -	0.2	53
			Vanadium	Hair	0.04	- -	0.006	0.04
			Naphthalene	Body Weight	0.003	- -	0.002	0.005
			Chlorobenzene	Liver	0.1	- -	0.03	0.1
			cis-1,2-Dichloroethene	Kidneys	0.2	- -	0.02	0.2
			Vinyl chloride	Liver	0.08	- -	0.004	0.09
			1,4-Dichlorobenzene	Liver	0.002	- -	0.0010	0.003
			Cyanide	Reproductive Effects	1	- -	0.006	1
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	--	70	--	7	77
	Exposure Medium Total							77
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								77
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	None Reported	0.010	- -	0.01	0.02
			Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Chemical Total	--	0.7	--	0.1	0.7
	Exposure Medium Total							0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	0.02	- -	0.004	0.02
			Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	--	0.02	--	0.009	0.03
	Exposure Medium Total							0.03

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Hair	0.09	- -	0.003	0.1
			Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	--	0.6	--	0.1	0.7
	Exposure Medium Total							0.7
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	Thyroid	8	- -	0.3	8
			Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	Autoimmune Effects	0.02	- -	0.0085	0.03
			2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	--	9	--	0.5	9
	Exposure Medium Total							9
Sediment Total								11
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.006	0.008
			Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	1	1
	Exposure Medium Total							1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0004	- -	0.04	0.04
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	0.05	0.2
	Exposure Medium Total							0.2

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Hair	0.08	- -	0.004	0.09
			Cyanide	Reproductive Effects	0.002	- -	0.0001	0.002
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.4	--	0.8	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	Liver	0.37	- -	- -	0.37
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			4,4'-DDT	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	3	- -	- -	3
			High Risk PCBs		NV	- -	- -	NV
			Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	Neurological	0.2	- -	- -	0.2
			Arsenic	Skin, Vascular	5	- -	- -	5
			Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	Thyroid	0.7	- -	- -	0.7
			Copper	Gastrointestinal Tract	0.1	- -	- -	0.1
			Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.2	- -	- -	0.2
			Zinc	Blood, Immune System	0.5	- -	- -	0.5
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		NV	- -	- -	NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		NV	- -	- -	NV
			Radium-228		NV	- -	- -	NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		NV	--	--	NV
			Chemical Total	--	112	--	--	112
	Exposure Medium Total							112

TABLE 9.21
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	Liver	0.26	- -	- -	0.26
			4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Arsenic	Skin, Vascular	2	- -	- -	2
			Cadmium	Kidneys	0.3	- -	- -	0.3
			Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	Gastrointestinal Tract	0.8	- -	- -	0.8
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	3	- -	- -	3
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		NV	- -	- -	NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		NV	- -	- -	NV
			Radium-228		NV	- -	- -	NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		NV	--	--	NV
			Chemical Total	--	16	--	--	16
	Exposure Medium Total							16
Tissue Ingestion Total								128

Total Hazard Index Across All Media	319

Total Neurological HI =	5
Total Body and Organ Weight HI =	0.9
Total Liver HI =	2
Total Blood HI =	7
Total Skin/Vascular HI =	10
Total Adrenal Glands HI =	0.000007
Total Eyes HI =	55
Total Immune System HI =	59
Total Nails HI =	55
Total Longevity HI =	4
Total Kidneys HI =	1
Total Gastrointestinal Tract HI =	6
Total None Reported HI =	0.8
Total Thyroid HI =	26
Total Reproductive Effects HI =	1
Total Hair HI =	60
Total Teeth HI =	0.3
Total Development HI =	145
Total Urinary Tract HI =	0.0001
Total Fetotoxicity HI =	0.0008
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.04
Total Endocrine System HI =	0.01

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil						
			1,2,4-Trichlorobenzene	Adrenal glands	0.0000006	- -	0.00000007	0.0000007
			Chlorobenzene	Liver	0.002	- -	0.0003	0.002
			1,4-Dichlorobenzene	Liver	0.00002	- -	0.000007	0.00002
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.002	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.0003	- -	0.0001	0.0004
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	Liver	0.00005	- -	0.00002	0.00008
			4,4'-DDT	Liver	0.000008	- -	0.000001	0.000010
			Heptachlor epoxide	Liver	0.0008	- -	0.0004	0.001
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	3	- -	2	6
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.04	- -	0.002	0.04
			Antimony	Blood and longevity	0.08	- -	0.02	0.1
			Arsenic	Skin/Vascular	0.03	- -	0.007	0.04
			Barium	Kidneys	0.002	- -	0.001	0.003
			Beryllium	Gastrointestinal Tract	0.001	- -	0.006	0.008
			Cadmium	Kidneys	0.02	- -	0.004	0.03
			Chromium (Total)	None Reported	0.002	- -	0.006	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.003	0.005
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Copper	Gastrointestinal Tract	0.1	- -	0.006	0.2
			Cyanide	Reproductive effects	0.0008	- -	0.00003	0.0008
			Iron	Gastrointestinal Tract	0.1	- -	0.005	0.1
			Manganese	Neurological	0.02	- -	0.02	0.05
			Nickel	Body and Organ weights	0.03	- -	0.04	0.07
			Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0009	- -	0.00004	0.0009
			Silver	Skin	0.001	- -	0.001	0.002
			Thallium	Hair	0.5	- -	0.02	0.5
			Vanadium	Hair	0.02	- -	0.04	0.06
			Zinc	Blood and immune system	0.02	- -	0.0009	0.02
			Mercury	Autoimmune effects	0.02	- -	0.0110	0.03
			Dioxin-like PCBs	Development	2	- -	1	3
			2,3,7,8-TCDD TEQ	Development	0.5	- -	0.1	0.6
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	- -	7	- -	3	11
	Exposure Medium Total							11

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions						
			1,2,4-Trichlorobenzene	Urinary tract	- -	0.00010	- -	0.00010
			Chlorobenzene	Liver, kidneys	- -	0.09	- -	0.09
			1,4-Dichlorobenzene	Liver	- -	0.00010	- -	0.00010
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0003	- -	0.0003
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.005	- -	0.005
			Antimony	NA	- -	NV	- -	NV
			Arsenic	, Cardiovascular system, Nervous syster	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0005	- -	0.0005
			Beryllium	Respiratory system, Immune system	- -	0.00006	- -	0.00006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.00003	- -	0.00003
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Cyanide	Thyroid	- -	0.0000003	- -	0.0000003
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.007	- -	0.007
			Nickel	Respiratory System	- -	0.004	- -	0.004
			Selenium	Liver, cardiovascular system, neurological	- -	0.0000001	- -	0.0000001
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0007	- -	0.0007
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	2	- -	2
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.01	- -	0.01
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA	- -	NV	- -	NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	NA	- -	NV	- -	NV
			Chemical Total		--	2	--	2
	Exposure Medium Total							2
Soil Total								12

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.02	- -	0.0001	0.02
			Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Barium	Kidneys	0.05	- -	0.004	0.05
			Cadmium	Kidneys	0.04	- -	0.005	0.05
			Chromium (Trivalent)	None Reported	0.00009	- -	0.00004	0.0001
			Chromium (Hexavalent)	None Reported	0.1	- -	0.06	0.2
			Cobalt	Thyroid	5	- -	0.011	5
			Iron	Gastrointestinal Tract	0.7	- -	0.004	0.8
			Manganese	Neurological	0.5	- -	0.07	0.6
			Mercury	Autoimmune Effects	0.05	- -	0.0003	0.05
			Nickel	Body and Organ Weights	0.03	- -	0.004	0.04
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.05	- -	0.0003	0.05
			Thallium	Hair	31	- -	0.2	32
			Vanadium	Hair	0.02	- -	0.005	0.03
			Naphthalene	Body Weight	0.002	- -	0.001	0.003
			Chlorobenzene	Liver	0.06	- -	0.02	0.08
			cis-1,2-Dichloroethene	Kidneys	0.1	- -	0.01	0.2
			Vinyl chloride	Liver	0.05	- -	0.003	0.05
			1,4-Dichlorobenzene	Liver	0.0010	- -	0.0006	0.002
			Cyanide	Reproductive Effects	0.8	- -	0.003	0.8
			Dioxin-Like PCBs	Development	0.005	- -	0.2	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	- -	42	--	4	46
	Exposure Medium Total							46
Groundwater	Air	Inhalation while Showering	Naphthalene	Nasal, Respiratory	- -	0.01	- -	0.01
			1,4-Dichlorobenzene	Liver	- -	0.0001	- -	0.0001
			Chlorobenzene	Liver, Kidneys	- -	0.04	- -	0.04
			cis-1,2-Dichloroethene	NA	- -	NV	- -	NV
			Vinyl chloride	Liver	- -	0.003	- -	0.003
			High Risk PCBs	NA	- -	NV	- -	NV
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00003	- -	0.00003
			2,3,7,8-TCDD	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0006	- -	0.0006
			Cyanide	Thyroid	- -	0.6	- -	0.6
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								47
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total							0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	0.002	- -	0.002	0.004
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Chemical Total		0.002	--	0.004	0.006
	Exposure Medium Total							0.006
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Hair	0.009	- -	0.002	0.01
			Dioxin-like PCBs	Development	0.007	- -	0.02	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total							0.1

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.0010
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.004
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		0.8	--	0.2	1
	Exposure Medium Total							1
Sediment Total								1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.00008	- -	0.02	0.02
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.02	0.05
	Exposure Medium Total							0.05
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	Hair	0.02	- -	0.002	0.02
			Cyanide	Reproductive Effects	0.0004	- -	0.00005	0.0005
			Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.08	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water Total								0.9

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	Liver	0.22	- -	- -	0.22
			4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		66	--	--	66
	Exposure Medium Total							66

TABLE 9.22
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	None Reported	0.09	- -	- -	0.09
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		13	--	--	13
	Exposure Medium Total							13
Tissue Ingestion Total								79

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Total Neurological HI =	3
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	6
Total Adrenal Glands HI =	0.0000007
Total Eyes HI =	9
Total Immune System HI =	12
Total Nails HI =	9
Total Longevity HI =	2
Total Kidneys HI =	0.6
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.4
Total Thyroid HI =	8
Total Reproductive Effects HI =	0.8
Total Hair HI =	33
Total Teeth HI =	0.2
Total Development HI =	73
Total Urinary Tract HI =	0.0001
Total Fetotoxicity HI =	0.0008
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.05
Total Endocrine System HI =	0.01

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil					
			1,2,4-Trichlorobenzene	2.E-10	- -	2.E-11	2.E-10
			Chlorobenzene	NV	- -	NV	NV
			1,4-Dichlorobenzene	8.E-09	- -	2.E-09	1.E-08
			Benzo(a)anthracene	6.E-07	- -	2.E-07	8.E-07
			Benzo(a)pyrene	6.E-06	- -	2.E-06	7.E-06
			Benzo(b)fluoranthene	4.E-07	- -	1.E-07	5.E-07
			Bis(2-ethylhexyl)phthalate	1.E-07	- -	3.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	2.E-06
			Indeno(1,2,3-cd)pyrene	3.E-07	- -	1.E-07	5.E-07
			Dieldrin	5.E-08	- -	1.E-08	7.E-08
			4,4'-DDT	2.E-09	- -	1.E-10	2.E-09
			Heptachlor epoxide	1.E-07	- -	3.E-08	2.E-07
			Aroclor 1248	3.E-04	- -	1.E-04	4.E-04
			Aroclor 1254	2.E-04	- -	7.E-05	2.E-04
			Aroclor 1260	8.E-05	- -	3.E-05	1.E-04
			High Risk PCB Congeners	2.E-03	- -	8.E-04	3.E-03
			Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Barium	NV	- -	NV	NV
			Beryllium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-05	- -	2.E-05	3.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Cyanide	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Silver	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Zinc	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Dioxin-like PCBs	2.E-04	- -	7.E-05	3.E-04
			2,3,7,8-TCDD TEQ	5.E-05	- -	5.E-06	6.E-05
			Bismuth-212	2.E-09	- -	6.E-05	6.E-05
			Bismuth-214	9.E-04	- -	1.E-02	1.E-02
			Cesium-137	4.E-09	- -	2.E-06	2.E-06
			Lead-210	1.E-03	- -	8.E-06	1.E-03
			Lead-212	6.E-08	- -	5.E-05	5.E-05
			Lead-214	1.E-03	- -	1.E-02	1.E-02
			Potassium-40	6.E-07	- -	6.E-05	6.E-05
			Protactinium-234M	2.E-05	- -	2.E-04	2.E-04
			Radium-226	2.E-04	- -	2.E-03	3.E-03
			Radium-228	3.E-06	- -	8.E-05	8.E-05
			Thallium-208	NV	- -	4.E-05	4.E-05
			Thorium-234	7.E-06	- -	7.E-05	8.E-05
			Uranium-235	2.E-07	- -	2.E-06	2.E-06
			Chemical Total	6.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions					
			1,2,4-Trichlorobenzene	- -	NV	- -	NV
			Chlorobenzene	- -	NV	- -	NV
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Benzo(a)anthracene	- -	1.E-08	- -	1.E-08
			Benzo(a)pyrene	- -	4.E-10	- -	4.E-10
			Benzo(b)fluoranthene	- -	3.E-11	- -	3.E-11
			Bis(2-ethylhexyl)phthalate	- -	3.E-12	- -	3.E-12
			Dibenzo(a,h)anthracene	- -	1.E-10	- -	1.E-10
			Indeno(1,2,3-cd)pyrene	- -	2.E-11	- -	2.E-11
			Dieldrin	- -	3.E-12	- -	3.E-12
			4,4'-DDT	- -	9.E-14	- -	9.E-14
			Heptachlor epoxide	- -	6.E-12	- -	6.E-12
			Aroclor 1248	- -	3.E-05	- -	3.E-05
			Aroclor 1254	- -	1.E-05	- -	1.E-05
			Aroclor 1260	- -	4.E-06	- -	4.E-06
			High Risk PCB Congeners	- -	3.E-04	- -	3.E-04
			Aluminum	- -	NV	- -	NV
			Antimony	- -	NV	- -	NV
			Arsenic	- -	2.E-08	- -	2.E-08
			Barium	- -	NV	- -	NV
			Beryllium	- -	1.E-09	- -	1.E-09
			Cadmium	- -	9.E-09	- -	9.E-09
			Chromium (Total)	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-07	- -	3.E-07
			Cobalt	- -	4.E-07	- -	4.E-07
			Copper	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Nickel	- -	4.E-08	- -	4.E-08
			Selenium	- -	NV	- -	NV
			Silver	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV
			Zinc	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Dioxin-like PCBs	- -	6.E-06	- -	6.E-06
			2,3,7,8-TCDD TEQ	- -	2.E-06	- -	2.E-06
			Bismuth-212	- -	3.E-11	- -	3.E-11
			Bismuth-214	- -	1.E-06	- -	1.E-06
			Cesium-137	- -	2.E-12	- -	2.E-12
			Lead-210	- -	2.E-06	- -	2.E-06
			Lead-212	- -	1.E-10	- -	1.E-10
			Lead-214	- -	1.E-06	- -	1.E-06
			Potassium-40	- -	5.E-10	- -	5.E-10
			Protactinium-234M	- -	8.E-08	- -	8.E-08
			Radium-226	- -	5.E-07	- -	5.E-07
			Radium-228	- -	4.E-08	- -	4.E-08
			Thallium-208	- -	NV	- -	NV
			Thorium-234	- -	3.E-08	- -	3.E-08
			Uranium-235	- -	8.E-09	- -	8.E-09
			Chemical Total	--	3.E-04	--	3.E-04
	Exposure Medium Total						3.E-04
Soil Total							3.E-02

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-04	- -	1.E-06	3.E-04
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Trivalent)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Naphthalene	NV	- -	NV	NV
			Chlorobenzene	NV	- -	NV	NV
			cis-1,2-Dichloroethene	NV	- -	NV	NV
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			1,4-Dichlorobenzene	2.E-07	- -	1.E-07	3.E-07
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-212	2.E-06	- -	3.E-11	2.E-06
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Potassium-40	2.E-05	- -	4.E-11	2.E-05
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Radium-228	1.E-04	- -	9.E-11	1.E-04
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Naphthalene	- -	4.E-07	- -	4.E-07
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Chlorobenzene	- -	NV	- -	NV
			cis-1,2-Dichloroethene	- -	NV	- -	NV
			Vinyl chloride	- -	4.E-07	- -	4.E-07
			High Risk PCBs	- -	2.E-07	- -	2.E-07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08
			2,3,7,8-TCDD	- -	3.E-07	- -	3.E-07
			Cyanide	- -	NV	- -	NV
			Bismuth-214	- -	NV	- -	NV
			Lead-210	- -	NV	- -	NV
			Lead-212	- -	NV	- -	NV
			Lead-214	- -	NV	- -	NV
			Potassium-40	- -	NV	- -	NV
			Radium-226	- -	2.E-01	- -	2.E-01
			Radium-228	- -	5.E-03	- -	5.E-03
			Strontium-90	- -	NV	- -	NV
			Chemical Total	- -	1.E-06	- -	2.E-01
	Exposure Medium Total						2.E-01
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Radium-226	2.E-07	- -	7.E-07	8.E-07
			Radium-228	7.E-08	- -	9.E-07	1.E-06
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	1.E-06	- -	4.E-07	1.E-06
			Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Bismuth-212	7.E-11	- -	9.E-07	9.E-07
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06
			Lead-212	2.E-09	- -	8.E-07	8.E-07
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Potassium-40	2.E-08	- -	1.E-06	1.E-06
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Radium-228	1.E-07	- -	1.E-06	1.E-06
			Thallium-208	NV	- -	6.E-07	6.E-07
			Thorium-234	2.E-07	- -	1.E-06	1.E-06
			Chemical Total	5.E-06	--	2.E-05	2.E-05
	Exposure Medium Total						2.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	3.E-07	5.E-07
			Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-07	4.E-07
			Bismuth-212	9.E-11	- -	1.E-06	1.E-06
			Bismuth-214	2.E-07	- -	9.E-07	1.E-06
			Cesium-137	4.E-10	- -	8.E-08	8.E-08
			Lead-212	3.E-09	- -	1.E-06	1.E-06
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	4.E-08	- -	2.E-06	2.E-06
			Radium-228	1.E-07	- -	2.E-06	2.E-06
			Thallium-208	NV	- -	1.E-06	1.E-06
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-08	- -	1.E-07	2.E-07
			Benzo(a)pyrene	5.E-07	- -	9.E-07	1.E-06
			Benzo(b)fluoranthene	5.E-08	- -	9.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Aroclor 1254	2.E-07	- -	6.E-07	8.E-07
			Aroclor 1260	2.E-07	- -	8.E-07	1.E-06
			Antimony	NV	- -	NV	NV
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-07	- -	2.E-07	5.E-07
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07
			Lead-212	3.E-09	- -	1.E-06	1.E-06
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	4.E-08	- -	2.E-06	2.E-06
			Radium-226	3.E-07	- -	1.E-06	2.E-06
			Radium-228	1.E-07	- -	2.E-06	2.E-06
			Thallium-208	NV	- -	1.E-06	1.E-06
			Chemical Total	1.E-05	--	6.E-05	7.E-05
	Exposure Medium Total						7.E-05
Sediment Total							4.E-04
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	4.E-07	- -	3.E-08	5.E-07
			Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	7.E-08	5.E-07
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	2.E-10	- -	4.E-08	4.E-08
			2,3,7,8-TCDD TEQ	5.E-09	- -	2.E-06	2.E-06
			Potassium-40	2.E-07	- -	3.E-11	2.E-07
			Chemical Total	9.E-07	--	3.E-06	4.E-06
	Exposure Medium Total						4.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	8.E-08	5.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04

TABLE 9.23
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			Dieldrin	8.E-06	- -	- -	8.E-06
			4,4'-DDD	7.E-07	- -	- -	7.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			4,4'-DDT	1.E-05	- -	- -	1.E-05
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Aluminum	NV	- -	- -	NV
			Arsenic	6.E-04	- -	- -	6.E-04
			Chromium (Hexavalent)	3.E-06	- -	- -	3.E-06
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	6.E-07	- -	- -	6.E-07
			Lead-214	2.E-04	- -	- -	2.E-04
			Potassium-40	4.E-05	- -	- -	4.E-05
			Radium-228	2.E-04	- -	- -	2.E-04
			Strontium-90	4.E-06	- -	- -	4.E-06
			Uranium-235	1.E-05	- -	- -	1.E-05
			Chemical Total	4.E-03	--	--	4.E-03
	Exposure Medium Total						4.E-03
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	4.E-06	- -	- -	4.E-06
			Aldrin	7.E-06	- -	- -	7.E-06
			Dieldrin	1.E-05	- -	- -	1.E-05
			4,4'-DDD	6.E-07	- -	- -	6.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Arsenic	2.E-04	- -	- -	2.E-04
			Cadmium	NV	- -	- -	NV
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	5.E-07	- -	- -	5.E-07
			Lead-214	6.E-05	- -	- -	6.E-05
			Potassium-40	4.E-05	- -	- -	4.E-05
			Radium-228	1.E-04	- -	- -	1.E-04
			Strontium-90	3.E-06	- -	- -	3.E-06
			Uranium-235	1.E-05	- -	- -	1.E-05
			Chemical Total	1.E-03	--	--	1.E-03
	Exposure Medium Total						1.E-03
Tissue Ingestion Total							5.E-03

3.E-01

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil						
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.07	- -	0.02	0.10
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.009	- -	0.002	0.01
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	2	- -	0.5	2
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	1	- -	0.03	1
			Antimony	Blood and longevity	1	- -	0.2	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Barium	Kidneys	0.03	- -	0.009	0.04
			Cadmium	Kidneys	0.3	- -	0.02	0.3
			Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	None Reported	0.08	- -	0.07	0.1
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.05	2
			Iron	Gastrointestinal Tract	3	- -	0.07	3
			Manganese	Neurological	0.4	- -	0.2	0.6
			Nickel	Body and Organ weights	0.2	- -	0.1	0.4
			Silver	Skin	0.02	- -	0.01	0.04
			Thallium	Hair	13	- -	0.3	13
			Vanadium	Hair	0.7	- -	0.6	1
			Zinc	Blood and immune system	0.3	- -	0.008	0.3
			Mercury	Autoimmune effects	0.3	- -	0.1	0.4
			Dioxin-like PCBs	Development	4	- -	1	6
			2,3,7,8-TCDD TEQ	Development	9	- -	1	10
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	- -	45	- -	5	50
	Exposure Medium Total							50

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Air	Volatile and Fugitive Dust Emissions						
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0006	- -	0.0006
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.01	- -	0.01
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0006	- -	0.0006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.010	- -	0.010
			Nickel	Respiratory System	- -	0.003	- -	0.003
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.002	- -	0.002
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	3	- -	3
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.006	- -	0.006
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA	- -	NV	- -	NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	NA	- -	NV	- -	NV
			Chemical Total		--	3	--	3
	Exposure Medium Total							3
Soil Total								53

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.04	- -	0.0002	0.04
			Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Barium	Kidneys	0.08	- -	0.005	0.09
			Cadmium	Kidneys	0.07	- -	0.007	0.08
			Chromium (Trivalent)	None Reported	0.0001	- -	0.00005	0.0002
			Chromium (Hexavalent)	None Reported	0.2	- -	0.07	0.3
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Mercury	Autoimmune Effects	0.08	- -	0.0004	0.09
			Nickel	Body and Organ Weights	0.05	- -	0.001	0.05
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.08	- -	0.0004	0.08
			Thallium	Hair	52	- -	0.2	53
			Vanadium	Hair	0.04	- -	0.006	0.04
			Naphthalene	Body Weight	0.003	- -	0.002	0.005
			Chlorobenzene	Liver	0.1	- -	0.03	0.1
			cis-1,2-Dichloroethene	Kidneys	0.2	- -	0.02	0.2
			Vinyl chloride	Liver	0.08	- -	0.004	0.09
			1,4-Dichlorobenzene	Liver	0.002	- -	0.0010	0.003
			Cyanide	Reproductive Effects	1	- -	0.006	1
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	--	70	--	7	77
	Exposure Medium Total							77
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								77
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	None Reported	0.010	- -	0.01	0.02
			Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Chemical Total	--	0.7	--	0.06	0.7
	Exposure Medium Total							0.7

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	0.02	- -	0.004	0.02
			Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Chemical Total	--	0.02	--	0.009	0.03
	Exposure Medium Total							0.03
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Hair	0.09	- -	0.003	0.1
			Dioxin-like PCBs	Development	0.08	- -	0.01	0.08
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	--	0.6	--	0.1	0.7
	Exposure Medium Total							0.7
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	Thyroid	8	- -	0.3	8
			Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	Autoimmune Effects	0.02	- -	0.0006	0.02
			2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	--	9	--	0.5	9
	Exposure Medium Total							9
Sediment Total								11

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.006	0.008
			Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	0.9	1
	Exposure Medium Total							1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0004	- -	0.04	0.04
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	0.05	0.2
	Exposure Medium Total							0.2
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Hair	0.08	- -	0.004	0.09
			Cyanide	Reproductive Effects	0.002	- -	0.0001	0.002
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.4	--	0.8	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	Liver	0.37	- -	- -	0.37
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			4,4'-DDT	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	3	- -	- -	3
			High Risk PCBs		NV	- -	- -	NV
			Aluminum	Neurological	0.2	- -	- -	0.2
			Arsenic	Skin, Vascular	5	- -	- -	5
			Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	Thyroid	0.7	- -	- -	0.7
			Copper	Gastrointestinal Tract	0.1	- -	- -	0.1
			Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.2	- -	- -	0.2
			Zinc	Blood, Immune System	0.5	- -	- -	0.5
			Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		NV	- -	- -	NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		NV	- -	- -	NV
			Radium-228		NV	- -	- -	NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		NV	--	--	NV
			Chemical Total	--	112	--	--	112
	Exposure Medium Total							112

TABLE 9.24
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	Liver	0.04	- -	- -	0.04
			4,4'-DDD	Liver	0.26	- -	- -	0.26
			4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	2	- -	- -	2
			Cadmium	Kidneys	0.3	- -	- -	0.3
			Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	Gastrointestinal Tract	0.8	- -	- -	0.8
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	3	- -	- -	3
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		NV	- -	- -	NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		NV	- -	- -	NV
			Radium-228		NV	- -	- -	NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		NV	--	--	NV
			Chemical Total	--	16	--	--	16
	Exposure Medium Total							16
Tissue Ingestion Total								128

Total Hazard Index Across All Media	271
Total Neurological HI =	7
Total Body and Organ Weight HI =	0.7
Total Liver HI =	2
Total Blood HI =	8
Total Skin/Vascular HI =	10
Total Adrenal Glands HI =	0.000000
Total Eyes HI =	8
Total Immune System HI =	12
Total Nails HI =	8
Total Longevity HI =	4
Total Kidneys HI =	1
Total Gastrointestinal Tract HI =	8
Total None Reported HI =	0.8
Total Thyroid HI =	25
Total Reproductive Effects HI =	1
Total Hair HI =	69
Total Teeth HI =	0.3
Total Development HI =	132
Total Urinary Tract HI =	0.00000
Total Fetotoxicity HI =	0.0012
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.03
Total Endocrine System HI =	0.01

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil						
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.007	- -	0.004	0.01
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.0008	- -	0.0004	0.001
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	0.1	- -	0.09	0.2
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.1	- -	0.005	0.1
			Antimony	Blood and longevity	0.1	- -	0.03	0.1
			Arsenic	Skin/Vascular	0.04	- -	0.007	0.04
			Barium	Kidneys	0.003	- -	0.002	0.004
			Cadmium	Kidneys	0.02	- -	0.004	0.03
			Chromium (Total)	None Reported	0.0003	- -	0.0009	0.001
			Chromium (Hexavalent)	None Reported	0.007	- -	0.01	0.02
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Copper	Gastrointestinal Tract	0.2	- -	0.008	0.2
			Iron	Gastrointestinal Tract	0.3	- -	0.01	0.3
			Manganese	Neurological	0.03	- -	0.04	0.07
			Nickel	Body and Organ weights	0.02	- -	0.02	0.04
			Silver	Skin	0.002	- -	0.002	0.005
			Thallium	Hair	1	- -	0.05	1
			Vanadium	Hair	0.06	- -	0.1	0.2
			Zinc	Blood and immune system	0.03	- -	0.001	0.03
			Mercury	Autoimmune effects	0.03	- -	0.018	0.05
			Dioxin-like PCBs	Development	0.4	- -	0.2	0.6
			2,3,7,8-TCDD TEQ	Development	0.9	- -	0.1	1
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Protactinium-234M	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Uranium-235	NA	NV	- -	NV	NV
			Chemical Total	- -	4	- -	1	5
	Exposure Medium Total							5

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions						
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0006	- -	0.0006
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.01	- -	0.01
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0006	- -	0.0006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.010	- -	0.010
			Nickel	Respiratory System	- -	0.003	- -	0.003
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.002	- -	0.002
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	3	- -	3
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.006	- -	0.006
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA	- -	NV	- -	NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Protactinium-234M	NA	- -	NV	- -	NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Thorium-234	NA	- -	NV	- -	NV
			Uranium-235	NA	- -	NV	- -	NV
			Chemical Total		--	3	--	3
	Exposure Medium Total							3
Soil Total								8

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.02	- -	0.0001	0.02
			Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Barium	Kidneys	0.05	- -	0.004	0.05
			Cadmium	Kidneys	0.04	- -	0.005	0.05
			Chromium (Trivalent)	None Reported	0.00009	- -	0.00004	0.0001
			Chromium (Hexavalent)	None Reported	0.1	- -	0.06	0.2
			Cobalt	Thyroid	5	- -	0.011	5
			Iron	Gastrointestinal Tract	0.7	- -	0.004	0.8
			Manganese	Neurological	0.5	- -	0.07	0.6
			Mercury	Autoimmune Effects	0.05	- -	0.0003	0.05
			Nickel	Body and Organ Weights	0.03	- -	0.004	0.04
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.05	- -	0.0003	0.05
			Thallium	Hair	31	- -	0.2	32
			Vanadium	Hair	0.02	- -	0.005	0.03
			Naphthalene	Body Weight	0.002	- -	0.001	0.003
			Chlorobenzene	Liver	0.06	- -	0.02	0.08
			cis-1,2-Dichloroethene	Kidneys	0.1	- -	0.01	0.2
			Vinyl chloride	Liver	0.05	- -	0.003	0.05
			1,4-Dichlorobenzene	Liver	0.0010	- -	0.0006	0.002
			Cyanide	Reproductive Effects	0.8	- -	0.003	0.8
			Dioxin-Like PCBs	Development	0.005	- -	2.49E-01	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	- -	42	--	4	46
	Exposure Medium Total							46
Groundwater	Air	Inhalation while Showering	Naphthalene	Nasal, Respiratory	- -	0.01	- -	0.01
			1,4-Dichlorobenzene	Liver	- -	0.0001	- -	0.0001
			Chlorobenzene	Liver, Kidneys	- -	0.04	- -	0.04
			cis-1,2-Dichloroethene	NA	- -	NV	- -	NV
			Vinyl chloride	Liver	- -	0.003	- -	0.003
			High Risk PCBs	NA	- -	NV	- -	NV
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00003	- -	0.00003
			2,3,7,8-TCDD	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0006	- -	0.0006
			Cyanide	Thyroid	- -	0.6	- -	0.6
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								47
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total							0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	0.002	- -	0.002	0.004
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Thorium-234	NA	NV	- -	NV	NV
			Chemical Total		0.002	--	0.004	0.006
	Exposure Medium Total							0.006
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Hair	0.009	- -	0.002	0.01
			Dioxin-like PCBs	Development	0.007	- -	0.018	0.025
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total							0.1

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.0010
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	Autoimmune Effects	0.002	- -	0.0003	0.002
			2,3,7,8-TCDD TEQ	Development	0.003	- -	0.00	0.00
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total		0.8	--	0.2	1
	Exposure Medium Total							1
Sediment Total								1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.00008	- -	0.02	0.02
			Potassium-40	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.02	0.05
	Exposure Medium Total							0.05

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	Hair	0.02	- -	0.002	0.02
			Cyanide	Reproductive Effects	0.0004	- -	0.00005	0.0005
			Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.08	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water Total								0.9
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Liver	0.02	- -	- -	0.02
			4,4'-DDD	Liver	0.22	- -	- -	0.22
			4,4'-DDE	Liver	0.04	- -	- -	0.04
			4,4'-DDT	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	0.1	- -	- -	0.1
			Arsenic	Skin, Vascular	3	- -	- -	3
			Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	Gastrointestinal Tract	0.07	- -	- -	0.07
			Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	0.3	- -	- -	0.3
			Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		66	--	--	66
	Exposure Medium Total							66

TABLE 9.25
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	NV	- -	- -	NV
			Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Liver	0.03	- -	- -	0.03
			4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	1	- -	- -	1
			Cadmium	Kidneys	0.2	- -	- -	0.2
			Chromium (Hexavalent)	None Reported	0.09	- -	- -	0.09
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Gastrointestinal Tract	0.6	- -	- -	0.6
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	2	- -	- -	2
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Bismuth-214		NV	--	--	NV
			Cesium-137		NV	--	--	NV
			Lead-214		NV	--	--	NV
			Potassium-40		NV	--	--	NV
			Radium-228		NV	--	--	NV
			Strontium-90		NV	--	--	NV
			Uranium-235		NV	--	--	NV
			Chemical Total		13	--	--	13
	Exposure Medium Total							13
Tissue Ingestion Total								79

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Total Neurological HI =	4
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	6
Total Adrenal Glands HI =	0.0000000
Total Eyes HI =	4
Total Immune System HI =	7
Total Nails HI =	4
Total Longevity HI =	2
Total Kidneys HI =	0.5
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.4
Total Thyroid HI =	8
Total Reproductive Effects HI =	0.8
Total Hair HI =	33
Total Teeth HI =	0.2
Total Development HI =	71
Total Urinary Tract HI =	0.00000
Total Fetotoxicity HI =	0.0012
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.05
Total Endocrine System HI =	0.01

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil					
			Benzo(a)anthracene	1.E-06	- -	4.E-07	2.E-06
			Benzo(a)pyrene	1.E-05	- -	4.E-06	2.E-05
			Benzo(b)fluoranthene	1.E-06	- -	5.E-07	2.E-06
			Bis(2-ethylhexyl)phthalate	3.E-07	- -	8.E-08	4.E-07
			Dibenzo(a,h)anthracene	3.E-06	- -	1.E-06	5.E-06
			Indeno(1,2,3-cd)pyrene	8.E-07	- -	3.E-07	1.E-06
			Aroclor 1248	1.E-05	- -	5.E-06	2.E-05
			Aroclor 1254	7.E-06	- -	3.E-06	1.E-05
			Aroclor 1260	2.E-05	- -	7.E-06	2.E-05
			High Risk PCB Congeners	3.E-05	- -	1.E-05	5.E-05
			Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-05	- -	6.E-05	1.E-04
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Silver	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Zinc	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Dioxin-like PCBs	4.E-05	- -	2.E-05	6.E-05
			2,3,7,8-TCDD TEQ	1.E-04	- -	8.E-06	1.E-04
			Bismuth-212	2.E-09	- -	6.E-05	6.E-05
			Bismuth-214	1.E-03	- -	1.E-02	1.E-02
			Cesium-137	5.E-09	- -	2.E-06	2.E-06
			Lead-210	2.E-03	- -	1.E-05	2.E-03
			Lead-212	6.E-08	- -	5.E-05	5.E-05
			Lead-214	1.E-03	- -	2.E-02	2.E-02
			Potassium-40	6.E-07	- -	6.E-05	6.E-05
			Protactinium-234M	2.E-05	- -	2.E-04	2.E-04
			Radium-226	1.E-05	- -	2.E-04	2.E-04
			Radium-228	3.E-06	- -	8.E-05	9.E-05
			Thallium-208	NV	- -	4.E-05	4.E-05
			Thorium-234	8.E-06	- -	8.E-05	9.E-05
			Uranium-235	4.E-07	- -	4.E-06	5.E-06
			Chemical Total	5.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions					
			Benzo(a)anthracene	- -	2.E-08	- -	2.E-08
			Benzo(a)pyrene	- -	8.E-10	- -	8.E-10
			Benzo(b)fluoranthene	- -	9.E-11	- -	9.E-11
			Bis(2-ethylhexyl)phthalate	- -	9.E-12	- -	9.E-12
			Dibenzo(a,h)anthracene	- -	2.E-10	- -	2.E-10
			Indeno(1,2,3-cd)pyrene	- -	5.E-11	- -	5.E-11
			Aroclor 1248	- -	1.E-06	- -	1.E-06
			Aroclor 1254	- -	5.E-07	- -	5.E-07
			Aroclor 1260	- -	9.E-07	- -	9.E-07
			High Risk PCB Congeners	- -	4.E-06	- -	4.E-06
			Aluminum	- -	NV	- -	NV
			Antimony	- -	NV	- -	NV
			Arsenic	- -	2.E-08	- -	2.E-08
			Barium	- -	NV	- -	NV
			Cadmium	- -	9.E-09	- -	9.E-09
			Chromium (Total)	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-06	- -	1.E-06
			Cobalt	- -	4.E-07	- -	4.E-07
			Copper	- -	NV	- -	NV
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Nickel	- -	2.E-08	- -	2.E-08
			Silver	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV
			Zinc	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Dioxin-like PCBs	- -	2.E-06	- -	2.E-06
			2,3,7,8-TCDD TEQ	- -	3.E-06	- -	3.E-06
			Bismuth-212	- -	3.E-11	- -	3.E-11
			Bismuth-214	- -	1.E-06	- -	1.E-06
			Cesium-137	- -	3.E-12	- -	3.E-12
			Lead-210	- -	3.E-06	- -	3.E-06
			Lead-212	- -	1.E-10	- -	1.E-10
			Lead-214	- -	2.E-06	- -	2.E-06
			Potassium-40	- -	5.E-10	- -	5.E-10
			Protactinium-234M	- -	8.E-08	- -	8.E-08
			Radium-226	- -	3.E-08	- -	3.E-08
			Radium-228	- -	4.E-08	- -	4.E-08
			Thallium-208	- -	NV	- -	NV
			Thorium-234	- -	3.E-08	- -	3.E-08
			Uranium-235	- -	2.E-08	- -	2.E-08
			Chemical Total	--	2.E-05	--	2.E-05
	Exposure Medium Total						2.E-05
Soil Total							3.E-02

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-04	- -	1.E-06	3.E-04
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Trivalent)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Naphthalene	NV	- -	NV	NV
			Chlorobenzene	NV	- -	NV	NV
			cis-1,2-Dichloroethene	NV	- -	NV	NV
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			1,4-Dichlorobenzene	2.E-07	- -	1.E-07	3.E-07
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-212	2.E-06	- -	3.E-11	2.E-06
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Potassium-40	2.E-05	- -	4.E-11	2.E-05
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Radium-228	1.E-04	- -	9.E-11	1.E-04
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Naphthalene	- -	4.E-07	- -	4.E-07
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Chlorobenzene	- -	NV	- -	NV
			cis-1,2-Dichloroethene	- -	NV	- -	NV
			Vinyl chloride	- -	4.E-07	- -	4.E-07
			High Risk PCBs	- -	2.E-07	- -	2.E-07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08
			2,3,7,8-TCDD	- -	3.E-07	- -	3.E-07
			Cyanide	- -	NV	- -	NV
			Bismuth-214	- -	NV	- -	NV
			Lead-210	- -	NV	- -	NV
			Lead-212	- -	NV	- -	NV
			Lead-214	- -	NV	- -	NV
			Potassium-40	- -	NV	- -	NV
			Radium-226	- -	2.E-01	- -	2.E-01
			Radium-228	- -	5.E-03	- -	5.E-03
			Strontium-90	- -	NV	- -	NV
			Chemical Total	- -	2.E-01	- -	2.E-01
	Exposure Medium Total						2.E-01
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Radium-226	2.E-07	- -	7.E-07	8.E-07
			Radium-228	7.E-08	- -	9.E-07	1.E-06
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	1.E-06	- -	4.E-07	1.E-06
			Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Bismuth-212	7.E-11	- -	9.E-07	9.E-07
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06
			Lead-212	2.E-09	- -	8.E-07	8.E-07
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Potassium-40	2.E-08	- -	1.E-06	1.E-06
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Radium-228	1.E-07	- -	1.E-06	1.E-06
			Thallium-208	NV	- -	6.E-07	6.E-07
			Thorium-234	2.E-07	- -	1.E-06	1.E-06
			Chemical Total	5.E-06	--	2.E-05	2.E-05
	Exposure Medium Total						2.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	3.E-07	5.E-07
			Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-07	4.E-07
			Bismuth-212	6.E-10	- -	1.E-06	1.E-06
			Bismuth-214	1.E-06	- -	9.E-07	2.E-06
			Cesium-137	2.E-09	- -	8.E-08	8.E-08
			Lead-212	2.E-08	- -	1.E-06	1.E-06
			Lead-214	1.E-06	- -	1.E-06	2.E-06
			Potassium-40	2.E-07	- -	2.E-06	2.E-06
			Radium-228	8.E-07	- -	2.E-06	3.E-06
			Thallium-208	NV	- -	1.E-06	1.E-06
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-08	- -	1.E-07	2.E-07
			Benzo(a)pyrene	5.E-07	- -	9.E-07	1.E-06
			Benzo(b)fluoranthene	5.E-08	- -	9.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Aroclor 1254	2.E-07	- -	6.E-07	8.E-07
			Aroclor 1260	2.E-07	- -	8.E-07	1.E-06
			Antimony	NV	- -	NV	NV
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-07	- -	2.E-07	5.E-07
			Bismuth-212	1.E-10	- -	1.E-06	1.E-06
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07
			Lead-212	3.E-09	- -	1.E-06	1.E-06
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	4.E-08	- -	2.E-06	2.E-06
			Radium-226	3.E-07	- -	1.E-06	2.E-06
			Radium-228	1.E-07	- -	2.E-06	2.E-06
			Thallium-208	NV	- -	1.E-06	1.E-06
			Chemical Total	1.E-05	--	6.E-05	7.E-05
	Exposure Medium Total						7.E-05
Sediment Total							4.E-04

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	4.E-07	- -	3.E-08	5.E-07
			Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	7.E-08	5.E-07
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	2.E-10	- -	4.E-08	4.E-08
			2,3,7,8-TCDD TEQ	5.E-09	- -	2.E-06	2.E-06
			Potassium-40	2.E-07	- -	3.E-11	2.E-07
			Chemical Total	9.E-07	--	3.E-06	4.E-06
	Exposure Medium Total						4.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	8.E-08	5.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			Dieldrin	8.E-06	- -	- -	8.E-06
			4,4'-DDD	7.E-07	- -	- -	7.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			4,4'-DDT	1.E-05	- -	- -	1.E-05
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Aluminum	NV	- -	- -	NV
			Arsenic	6.E-04	- -	- -	6.E-04
			Chromium (Hexavalent)	8.E-06	- -	- -	8.E-06
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	6.E-07	- -	- -	6.E-07
			Lead-214	2.E-04	- -	- -	2.E-04
			Potassium-40	4.E-05	- -	- -	4.E-05
			Radium-228	2.E-04	- -	- -	2.E-04
			Strontium-90	4.E-06	- -	- -	4.E-06
			Uranium-235	1.E-05	- -	- -	1.E-05
			Chemical Total	4.E-03	--	--	4.E-03
	Exposure Medium Total						4.E-03

TABLE 9.26
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	1.E-05	- -	- -	1.E-05
			Aldrin	7.E-06	- -	- -	7.E-06
			Dieldrin	1.E-05	- -	- -	1.E-05
			4,4'-DDD	6.E-07	- -	- -	6.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			Arsenic	2.E-04	- -	- -	2.E-04
			Cadmium	NV	- -	- -	NV
			Chromium (Hexavalent)	2.E-04	- -	- -	2.E-04
			Cobalt	NV	- -	- -	NV
			Copper	NV	- -	- -	NV
			Iron	NV	- -	- -	NV
			Zinc	NV	- -	- -	NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	5.E-07	- -	- -	5.E-07
			Lead-214	6.E-05	- -	- -	6.E-05
			Potassium-40	4.E-05	- -	- -	4.E-05
			Radium-228	1.E-04	- -	- -	1.E-04
			Strontium-90	3.E-06	- -	- -	3.E-06
			Uranium-235	1.E-05	- -	- -	1.E-05
			Chemical Total	1.E-03	--	--	1.E-03
	Exposure Medium Total						1.E-03
Tissue Ingestion Total							5.E-03
							3.E-01

TABLE 9.27

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment						
			Aluminum	Neurological	0.3	- -	0.006	0.3
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Cobalt	Thyroid	4	- -	0.09	4
			Iron	Gastrointestinal Tract	0.8	- -	0.02	0.8
			Manganese	Neurological	0.1	- -	0.08	0.2
			Thallium	Hair	2	- -	0.06	2
			Vanadium	Hair	0.1	- -	0.1	0.3
			Mercury	Autoimmune effects	0.03	- -	0.0107	0.04
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	- -	8	- -	0.4	8
	Exposure Medium Total							8
	Air	Volatile and Fugitive Dust Emissions						
			Aluminum	Neurological	- -	0.003	- -	0.003
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Cobalt	Respiratory System	- -	0.01	- -	0.01
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.004	- -	0.004
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0004	- -	0.0004
			Mercury	Neurological	- -	0.3	- -	0.3
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Chemical Total		--	0.3	--	0.3
	Exposure Medium Total							0.3
Sediment Total								8

Total Hazard Index Across All Media, Complete Dataset	8

Total Neurological HI =	0.7
Total Skin/Vascular HI =	0.4
Total Immune System HI =	0.04
Total Gastrointestinal Tract HI =	0.8
Total Thyroid HI =	4
Total Hair HI =	3
Total Development HI =	0.0007
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.01

TABLE 9.28

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Aluminum	Neurological	0.02	- -	0.001	0.03
			Arsenic	Skin/Vascular	0.03	- -	0.007	0.04
			Cobalt	Thyroid	0.4	- -	0.01	0.4
			Iron	Gastrointestinal Tract	0.1	- -	0.003	0.1
			Manganese	Neurological	0.01	- -	0.01	0.03
			Thallium	Hair	0.2	- -	0.009	0.2
			Vanadium	Hair	0.01	- -	0.02	0.03
			Mercury	Autoimmune effects	0.003	- -	0.0018	0.005
			Bismuth-212	NA	NV	- -	NV	NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	NV	- -	NV	NV
			Radium-228	NA	NV	- -	NV	NV
			Thallium-208	NA	NV	- -	NV	NV
			Chemical Total	- -	0.7	- -	0.1	0.8
	Exposure Medium Total							0.8
	Air	Volatile and Fugitive Dust Emissions	Aluminum	Neurological	- -	0.003	- -	0.003
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Cobalt	Respiratory System	- -	0.01	- -	0.01
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.004	- -	0.004
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0004	- -	0.0004
			Mercury	Neurological	- -	0.3	- -	0.3
			Bismuth-212	NA	- -	NV	- -	NV
			Bismuth-214	NA	- -	NV	- -	NV
			Lead-212	NA	- -	NV	- -	NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	- -	NV	- -	NV
			Radium-228	NA	- -	NV	- -	NV
			Thallium-208	NA	- -	NV	- -	NV
			Chemical Total		--	0.3	--	0.3
	Exposure Medium Total							0.3
Sediment Total								1

Total Hazard Index Across All Media, Complete Dataset	1

Total Neurological HI =	0.3
Total Skin/Vascular HI =	0.04
Total Immune System HI =	0.005
Total Gastrointestinal Tract HI =	0.07
Total Thyroid HI =	0.4
Total Hair HI =	0.3
Total Development HI =	0.0007
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.01

TABLE 9.29

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Aluminum	NV	- -	NV	NV
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Bismuth-212	2.E-09	- -	7.E-05	7.E-05
			Bismuth-214	3.E-06	- -	4.E-05	4.E-05
			Lead-212	8.E-08	- -	7.E-05	7.E-05
			Lead-214	4.E-06	- -	5.E-05	5.E-05
			Potassium-40	1.E-06	- -	1.E-04	1.E-04
			Radium-228	4.E-06	- -	1.E-04	1.E-04
			Thallium-208	NV	- -	5.E-05	5.E-05
			Chemical Total	3.E-05	- -	5.E-04	5.E-04
	Exposure Medium Total						5.E-04
	Air	Volatile and Fugitive Dust Emissions	Aluminum	- -	NV	- -	NV
			Arsenic	- -	2.E-08	- -	2.E-08
			Cobalt	- -	2.E-07	- -	2.E-07
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Bismuth-212	- -	2.E-20	- -	2.E-20
			Bismuth-214	- -	3.E-18	- -	3.E-18
			Lead-212	- -	1.E-19	- -	1.E-19
			Lead-214	- -	4.E-18	- -	4.E-18
			Potassium-40	- -	6.E-19	- -	6.E-19
			Radium-228	- -	4.E-17	- -	4.E-17
			Thallium-208	- -	NV	- -	NV
			Chemical Total	--	2.E-07	--	2.E-07
	Exposure Medium Total						2.E-07
Sediment Total							5.E-04

Total Risk Across All Media, Complete Dataset 5.E-04

TABLE 9.30
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)anthracene	2.E-07	- -	6.E-08	2.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological	0.01	- -	0.004	0.02
			Benzo(b)fluoranthene	2.E-07	- -	7.E-08	3.E-07	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-08	- -	9.E-09	5.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.002	- -	0.0004	0.002
			Dibenzo(a,h)anthracene	5.E-07	- -	2.E-07	7.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-07	- -	4.E-08	2.E-07	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	9.E-07	- -	3.E-07	1.E-06	Aroclor 1254	Eyes, Nails, Immune System	0.3	- -	0.09	0.4
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.2	- -	0.005	0.2
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.2	- -	0.03	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular	0.06	- -	0.008	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.006
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.001	0.001
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.009	0.4
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.5	- -	0.01	0.5
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.04	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.04	- -	0.02	0.06
			Silver	NV	- -	NV	NV	Silver	Skin	0.004	- -	0.003	0.007
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.06	- -	0.001	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.06	- -	0.019	0.07
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0.2	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0.1	2
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	8	- -	1	9
	Exposure Medium Total						9.E-04						9

TABLE 9.30
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	--	3.E-10	--	3.E-10	Benzo(a)anthracene	NA	--	NV	--	NV
			Benzo(a)pyrene	--	1.E-11	--	1.E-11	Benzo(a)pyrene	Fetotoxicity	--	0.00002	--	0.00002
			Benzo(b)fluoranthene	--	1.E-12	--	1.E-12	Benzo(b)fluoranthene	NA	--	NV	--	NV
			Bis(2-ethylhexyl)phthalate	--	6.E-14	--	6.E-14	Bis(2-ethylhexyl)phthalate	NA	--	NV	--	NV
			Dibenzo(a,h)anthracene	--	3.E-12	--	3.E-12	Dibenzo(a,h)anthracene	NA	--	NV	--	NV
			Indeno(1,2,3-cd)pyrene	--	6.E-13	--	6.E-13	Indeno(1,2,3-cd)pyrene	NA	--	NV	--	NV
			Aroclor 1248	--	9.E-09	--	9.E-09	Aroclor 1248	NA	--	NV	--	NV
			Aroclor 1254	--	4.E-09	--	4.E-09	Aroclor 1254	NA	--	NV	--	NV
			Aroclor 1260	--	6.E-09	--	6.E-09	Aroclor 1260	NA	--	NV	--	NV
			High Risk PCB Congeners	--	3.E-08	--	3.E-08	High Risk PCB Congeners	NA	--	NV	--	NV
			Aluminum	--	NV	--	NV	Aluminum	Neurological	--	0.0004	--	0.0004
			Antimony	--	NV	--	NV	Antimony	NA	--	NV	--	NV
			Arsenic	--	1.E-10	--	1.E-10	Arsenic	rdiovascular system, Nervous s	--	0.00002	--	0.00002
			Barium	--	NV	--	NV	Barium	Fetotoxicity	--	0.00002	--	0.00002
			Cadmium	--	6.E-11	--	6.E-11	Cadmium	Kidneys	--	0.00004	--	0.00004
			Chromium (Total)	--	NV	--	NV	Chromium (Total)	NA	--	NV	--	NV
			Chromium (Hexavalent)	--	1.E-08	--	1.E-08	Chromium (Hexavalent)	Respiratory System	--	0.00000	--	0.00000
			Cobalt	--	3.E-09	--	3.E-09	Cobalt	Respiratory System	--	0.0005	--	0.0005
			Copper	--	NV	--	NV	Copper	NA	--	NV	--	NV
			Iron	--	NV	--	NV	Iron	NA	--	NV	--	NV
			Manganese	--	NV	--	NV	Manganese	Neurological	--	0.0003	--	0.0003
			Nickel	--	1.E-10	--	1.E-10	Nickel	Respiratory System	--	0.00008	--	0.00008
			Silver	--	NV	--	NV	Silver	NA	--	NV	--	NV
			Thallium	--	NV	--	NV	Thallium	NA	--	NV	--	NV
			Vanadium	--	NV	--	NV	Vanadium	Respiratory System	--	0.00005	--	0.00005
			Zinc	--	NV	--	NV	Zinc	NA	--	NV	--	NV
			Mercury	--	NV	--	NV	Mercury	Neurological	--	0.07	--	0.07
			Dioxin-like PCBs	--	1.E-08	--	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	--	0.00008	--	0.00008
			2,3,7,8-TCDD TEQ	--	2.E-08	--	2.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	--	0.0002	--	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	--	3.E-09	--	3.E-09	Bismuth-214	NA	--	NV	--	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	--	5.E-09	--	5.E-09	Lead-210	NA	--	NV	--	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	--	3.E-09	--	3.E-09	Lead-214	NA	--	NV	--	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	--	6.E-11	--	6.E-11	Radium-226	NA	--	NV	--	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	1.E-07	--	1.E-07	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						1.E-07						0.08
Soil Total							9.E-04						9

TABLE 9.30
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	6.E-08	- -	6.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	6.E-08	--	6.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						6.E-08						0.009
Groundwater Total							6.E-08						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	9.E-07	- -	4.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.10	- -	0.003	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			0
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		0.7	--	0.06	0.7
	Exposure Medium Total						2.E-05						0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	8.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	9.E-08	- -	3.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	2.E-07	- -	5.E-07	7.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			0
			Chemical Total	3.E-06	--	5.E-06	8.E-06	Chemical Total		0.004	--	0.005	0.009
	Exposure Medium Total						8.E-06						0.009
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	6.E-07	- -	1.E-07	7.E-07	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Dioxin-like PCBs	6.E-07	- -	3.E-07	9.E-07	Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.5	--	0.1	0.6
	Exposure Medium Total						1.E-04						0.6

TABLE 9.30
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	1.E-07	- -	6.E-08	2.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	2.E-07	- -	8.E-08	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0006	0.02
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.0
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		9	--	0.5	9
	Exposure Medium Total						2.E-05						9
Sediment Total							1.E-04						11
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.0016	- -	0.006	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	1	1
			Radium-226	9.E-07	- -	1.E-11	9.E-07	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.10	--	1	1
	Exposure Medium Total						1.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.00687	- -	0.0003	0.007
			Chromium (Hexavalent)	2.E-07	- -	8.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	1.E-10	- -	7.E-09	8.E-09	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	5.E-07	--	8.E-07	1.E-06	Chemical Total		0.1	--	0.01	0.1
	Exposure Medium Total						1.E-06						0.1

TABLE 9.30
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.00034	0.007
			Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	1.E-08	- -	8.E-07	8.E-07	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.3	--	0.8	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							8.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 21

Total Neurological HI =	0.4
Total Body and Organ Weight HI =	0.3
Total Liver HI =	0.004
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.2
Total Eyes HI =	0.4
Total Immune System HI =	0.6
Total Nails HI =	0.4
Total Longevity HI =	0.3
Total Kidneys HI =	0.05
Total Gastrointestinal Tract HI =	1.0
Total None Reported HI =	0.3
Total Thyroid HI =	10
Total Reproductive Effects HI =	0.000
Total Hair HI =	3
Total Development HI =	5
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.31
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil											
			Benzo(a)anthracene	2.E-08	- -	5.E-08	7.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	5.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.005	0.01
			Benzo(b)fluoranthene	2.E-08	- -	6.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	8.E-09	- -	2.E-08	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.0004	0.0006
			Dibenzo(a,h)anthracene	5.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	3.E-08	4.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	4.E-07	- -	1.E-06	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	5.E-07	7.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.1	0.1
			Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.03	- -	0.01	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.03	- -	0.04	0.06
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin, Vascular	0.01	- -	0.01	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0006	- -	0.002	0.003
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.01	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00007	- -	0.001	0.001
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.05	- -	0.01	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.07	- -	0.01	0.09
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.04	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.01	- -	0.03	0.03
			Silver	NV	- -	NV	NV	Silver	Skin	0.0006	- -	0.003	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.06	0.4
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.1	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood, Iimmune system	0.01	- -	0.002	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.022	0.03
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.1	- -	0	0
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0	0
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	2.E-04	- -	8.E-04	1.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						1.E-03						2

TABLE 9.31
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	7.E-12	- -	7.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	9.E-13	- -	9.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-14	- -	9.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	5.E-13	- -	5.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	1.E-08	- -	1.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	5.E-09	- -	5.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-09	- -	9.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	4.E-08	- -	4.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	rdiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	3.E-08	- -	3.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	8.E-09	- -	8.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	9.E-09	- -	9.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	2.E-10	- -	2.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						2.E-07						0.08
Soil Total							1.E-03						2

TABLE 9.31
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	9.E-08	- -	9.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	9.E-08	--	9.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						9.E-08						0.009
Groundwater Total							9.E-08						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	8.E-08	- -	3.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Arsenic	3.E-07	- -	4.E-07	7.E-07	Arsenic	Skin, Vascular	0.005	- -	0.007	0.01
			Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.02	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.01	- -	0.004	0.02
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.04	- -	0.01	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	3.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.03	0.06
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			0
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total	--	0.09	--	0.1	0.2
	Exposure Medium Total						1.E-05						0.2
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.006	0.007
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	4.E-07	4.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	5.E-07	5.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	1.E-07	- -	8.E-07	9.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			0
			Chemical Total	5.E-07	--	5.E-06	5.E-06	Chemical Total	--	0.001	--	0.006	0.007
	Exposure Medium Total						5.E-06						0.007
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0006	0.0008
			Arsenic	1.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.003	0.005
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.10	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.04	- -	0.01	0.06
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Dioxin-like PCBs	1.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.01	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-08	6.E-08	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.002	0.00
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	5.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.07	--	0.2	0.2
	Exposure Medium Total						5.E-05						0.2

TABLE 9.31
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0004	- -	0.002	0.002
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-07	- -	5.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.005	- -	0.02	0.03
			Aroclor 1260	3.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.007	- -	0.01	0.02
			Arsenic	2.E-07	- -	3.E-07	5.E-07	Arsenic	Skin, Vascular	0.004	- -	0.005	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.006	0.006
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.001	- -	0.0004	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.005	- -	0.002	0.007
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.02	- -	0.2	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.02	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0007	0.003
			2,3,7,8-TCDD TEQ	4.E-08	- -	4.E-08	8.E-08	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.0	0.0
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	4.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total	--	1	--	0.6	2
	Exposure Medium Total						1.E-05						2
Sediment Total							8.E-05						2
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	0.0004	- -	0.007	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.004	0.03
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Radium-226	1.E-06	- -	2.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total	--	0.03	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	4.E-08	- -	7.E-07	7.E-07	Chromium (Hexavalent)	None Reported	0.00006	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	6.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	2.E-07	--	7.E-07	9.E-07	Chemical Total	--	0.02	--	0.00	0.03
	Exposure Medium Total						9.E-07						0.03

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SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00003	0.0002
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	6.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.1	0.1
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.1	--	1	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 6

Total Neurological HI =	0.2
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.002
Total Blood HI =	0.09
Total Skin/Vascular HI =	0.05
Total Eyes HI =	0.2
Total Immune System HI =	0.2
Total Nails HI =	0.2
Total Longevity HI =	0.08
Total Kidneys HI =	0.01
Total Gastrointestinal Tract HI =	0.2
Total None Reported HI =	0.3
Total Thyroid HI =	2
Total Reproductive Effects HI =	0.000
Total Hair HI =	0.7
Total Development HI =	3
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.32
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Benzo(a)anthracene	1.E-08	- -	6.E-09	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-07	- -	6.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0006	0.002
			Benzo(b)fluoranthene	1.E-08	- -	7.E-09	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	5.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0001	- -	0.00006	0.0002
			Dibenzo(a,h)anthracene	3.E-08	- -	2.E-08	5.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	7.E-09	- -	4.E-09	1.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	9.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-07	- -	2.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.02	- -	0.01	0.04
			Aroclor 1260	7.E-07	- -	4.E-07	1.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.0008	0.02
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.02	- -	0.005	0.02
			Arsenic	8.E-07	- -	2.E-07	9.E-07	Arsenic	Skin, Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0004	- -	0.0003	0.0007
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00005	- -	0.0002	0.0002
			Chromium (Hexavalent)	5.E-07	- -	9.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.04
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.006	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.004	- -	0.004	0.008
			Silver	NV	- -	NV	NV	Silver	Skin	0.0004	- -	0.0004	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.01	- -	0.02	0.03
			Zinc	NV	- -	NV	NV	Zinc	Blood, Iimmune system	0.005	- -	0.0002	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0032	0.008
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development	0.07	- -	0.0	0.1
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.7	- -	0.1	1
	Exposure Medium Total						2.E-03						1

TABLE 9.32
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	6.E-12	- -	6.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	7.E-13	- -	7.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-13	- -	2.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	4.E-13	- -	4.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-08	- -	3.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	2.E-08	- -	2.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	9.E-08	- -	9.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-10	- -	4.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	9.E-09	- -	9.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	5.E-10	- -	5.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	3.E-08	- -	3.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	7.E-08	- -	7.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	4.E-08	- -	4.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	4.E-10	- -	4.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	3.5E-07	--	3.5E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						4.E-07						0.08
Soil Total							2.E-03						1

TABLE 9.32
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	2.E-07	- -	2.E-07	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						2.E-07						0.009
Groundwater Total							2.E-07						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	4.E-07	- -	4.E-07	8.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	5.E-07	- -	3.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			0
			Chemical Total	1.E-06	--	4.E-06	5.E-06	Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total						5.E-06						0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-07	- -	1.E-06	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			0
			Chemical Total	8.E-07	--	5.E-06	5.E-06	Chemical Total		0.000	--	0.002	0.003
	Exposure Medium Total						5.E-06						0.003
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	2.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Not Site Related			0.E+00	Thallium	Hair	Not Site Related			0
			Dioxin-like PCBs	2.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.007	- -	0.02	0.0
			2,3,7,8-TCDD TEQ	5.E-08	- -	2.E-08	7.E-08	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.00
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	7.E-07	8.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	9.E-07	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	3.E-06	--	2.E-05	2.E-05	Chemical Total		0.05	--	0.1	0.1
	Exposure Medium Total						2.E-05						0.1

TABLE 9.32
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	3.E-09	- -	7.E-09	1.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.001
			Benzo(b)fluoranthene	2.E-09	- -	6.E-09	8.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	6.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	4.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	5.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	3.E-07	- -	3.E-07	6.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	7.E-08	- -	4.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.00
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-226		Not Site Related		0.E+00	Radium-226	NA		Not Site Related		0
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Chemical Total	1.E-06	--	5.E-06	6.E-06	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						6.E-06						1
Sediment Total							4.E-05						1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	1.E-05	2.E-05	Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total						2.E-05						0.4

TABLE 9.32
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	3.E-08	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	9.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	2.E-07	--	3.E-07	5.E-07	Chemical Total		0.02	--	0.003	0.03
	Exposure Medium Total						5.E-07						0.03
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	9.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	7.E-06	- -	8.E-11	7.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	2.E-05	3.E-05	Chemical Total		0.06	--	0.4	0.4
	Exposure Medium Total						3.E-05						0.4
Surface Water Total							5.E-05						0.9

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 3

Total Neurological HI =	0.1
Total Body and Organ Weight HI =	0.08
Total Liver HI =	0.002
Total Blood HI =	0.04
Total Skin/Vascular HI =	0.03
Total Eyes HI =	0.05
Total Immune System HI =	0.07
Total Nails HI =	0.05
Total Longevity HI =	0.03
Total Kidneys HI =	0.006
Total Gastrointestinal Tract HI =	0.09
Total None Reported HI =	0.1
Total Thyroid HI =	1
Total Reproductive Effects HI =	0.0002
Total Hair HI =	0.4
Total Development HI =	1
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.33
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil											
			Benzo(a)anthracene	2.E-07	- -	6.E-08	2.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological	0.01	- -	0.004	0.02
			Benzo(b)fluoranthene	2.E-07	- -	7.E-08	3.E-07	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-08	- -	9.E-09	5.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.002	- -	0.0004	0.002
			Dibenzo(a,h)anthracene	5.E-07	- -	2.E-07	7.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-07	- -	4.E-08	2.E-07	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	9.E-07	- -	3.E-07	1.E-06	Aroclor 1254	Eyes, Nails, Immune System	0.3	- -	0.09	0.4
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.2	- -	0.005	0.2
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.2	- -	0.03	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular	0.06	- -	0.008	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.006
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.0010	0.001
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.009	0.4
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.5	- -	0.01	0.5
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.04	0.10
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.04	- -	0.02	0.06
			Silver	NV	- -	NV	NV	Silver	Skin	0.004	- -	0.003	0.007
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.06	- -	0.001	0.06
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.06	- -	0.019	0.07
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0	2
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	8	- -	1	9
	Exposure Medium Total						9.E-04						9

TABLE 9.33
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	3.E-10	- -	3.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	1.E-11	- -	1.E-11	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	1.E-12	- -	1.E-12	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	6.E-14	- -	6.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	3.E-12	- -	3.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	6.E-13	- -	6.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	9.E-09	- -	9.E-09	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	4.E-09	- -	4.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	6.E-09	- -	6.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-08	- -	3.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	1.E-10	- -	1.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	3.E-09	- -	3.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	5.E-09	- -	5.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	6.E-11	- -	6.E-11	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	1.E-07	--	1.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						1.E-07						0.08
Soil Total							9.E-04						9

TABLE 9.33
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Dioxin-like PCBs	1.E-06	- -	1.E-07	1.E-06	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	3.E-07	- -	3.E-08	3.E-07	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	5.E-07	7.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		1	--	0.3	1
	Exposure Medium Total						1.E-04						1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	1.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	3.E-07	- -	2.E-07	5.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.03	- -	0.017	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	5.E-08	5.E-07	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.006	0.1
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	5.E-07	6.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		17	--	1	18
	Exposure Medium Total						2.E-05						18
Sediment Total							1.E-04						20
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	2.E-10	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	7.E-07	--	1.E-06	2.E-06	Chemical Total		0.2	--	0.01	0.2
	Exposure Medium Total						2.E-06						0.2

TABLE 9.33
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			High Risk PCBs	2.E-08	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0009	- -	0.09	0.09
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.5	--	1	2
	Exposure Medium Total						9.E-05						2
Surface Water Total							1.E-04						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	Background Constituent			0.E+00	Aluminum	Neurological	Background Constituent			0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	Background Constituent			0.E+00	Cobalt	Thyroid	Background Constituent			0
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Background Constituent			0.E+00	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Bismuth-214	2.E-05			2.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-07			3.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		101	--	--	101
	Exposure Medium Total						1.E-03						101

TABLE 9.33
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			0
			Aldrin	2.E-06	--	--	2.E-06	Aldrin	Liver	0.04	--	--	0.04
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	2.E-07	--	--	2.E-07	4,4'-DDD	Liver	0.3	--	--	0.3
			4,4'-DDE	6.E-07	--	--	6.E-07	4,4'-DDE	Liver	0.07	--	--	0.07
			Heptachlor epoxide	2.E-06	--	--	2.E-06	Heptachlor epoxide	Liver	0.2	--	--	0.2
			Aroclor 1254	7.E-06	--	--	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	--	--	2
			High Risk PCB Congeners	2.E-05	--	--	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	--	--	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	--	--	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			0.E+00	Cadmium	Kidneys	Background Constituent			0
			Chromium (Hexavalent)	8.E-05	--	--	8.E-05	Chromium (Hexavalent)	None Reported	0.1	--	--	0.1
			Cobalt	NV	--	--	NV	Cobalt	Thyroid	0.6	--	--	0.6
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	--	--	NV	Iron	Gastrointestinal Tract	0.1	--	--	0.1
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	--	--	NV	Mercury	Development, Neurological	0.3	--	--	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	--	--	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	--	--	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	2.E-07			2.E-07	Strontium-90		NV	--	--	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	2.E-04	--	--	2.E-04	Chemical Total		11	--	--	11
	Exposure Medium Total						2.E-04						11
Tissue Ingestion Total							1.E-03						112

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 142

Total Neurological HI =	1
Total Body and Organ Weight HI =	0.6
Total Liver HI =	0.7
Total Blood HI =	0.4
Total Skin/Vascular HI =	0.2
Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Longevity HI =	0.4
Total Kidneys HI =	0.05
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.6
Total Thyroid HI =	19
Total Reproductive Effects HI =	0.000
Total Hair HI =	3
Total Teeth HI =	0.0
Total Development HI =	111
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.34

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)anthracene	2.E-08	- -	5.E-08	7.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	5.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.005	0.01
			Benzo(b)fluoranthene	2.E-08	- -	6.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	8.E-09	- -	2.E-08	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.0004	0.001
			Dibenzo(a,h)anthracene	5.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	3.E-08	4.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	4.E-07	- -	1.E-06	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	5.E-07	7.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.10	0.1
			Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.03	- -	0.01	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.03	- -	0.04	0.1
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin, Vascular	0.01	- -	0.01	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.001	- -	0.002	0.003
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.01	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0001	- -	0.001	0.001
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.16	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.05	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.07	- -	0.01	0.1
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.04	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.01	- -	0.03	0.03
			Silver	NV	- -	NV	NV	Silver	Skin	0.001	- -	0.003	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.31	- -	0.06	0.4
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.12	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood, Immune system	0.01	- -	0.002	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.022	0.03
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.10	- -	0.29	0
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.22	- -	0.13	0
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	2.E-04	- -	8.E-04	1.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						1.E-03						2

TABLE 9.34
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	7.E-12	- -	7.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	9.E-13	- -	9.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-14	- -	9.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	5.E-13	- -	5.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	1.E-08	- -	1.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	5.E-09	- -	5.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-09	- -	9.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	4.E-08	- -	4.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-08	- -	1.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	3.E-08	- -	3.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	8.E-09	- -	8.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	9.E-09	- -	9.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	2.E-10	- -	2.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						2.E-07						0.08
Soil Total							1.E-03						2

TABLE 9.34
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.001	0.002
			Arsenic	2.E-07	- -	4.E-07	6.E-07	Arsenic	Skin, Vascular	0.004	- -	0.006	0.01
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.03	0.1
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Dioxin-like PCBs	2.E-07	- -	1.E-06	1.E-06	Dioxin-like PCBs	Development	0.02	- -	0.09	0.11
			2,3,7,8-TCDD TEQ	6.E-08	- -	6.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.005	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	5.E-06	--	5.E-05	6.E-05	Chemical Total		0.1	--	0.3	0.5
	Exposure Medium Total						6.E-05						0.5
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	9.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.010	- -	0.04	0.05
			Aroclor 1260	6.E-08	- -	3.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.03	0.04
			Arsenic	4.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.007	- -	0.01	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0007	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.003	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.04	- -	0.3	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.10	- -	0.03	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.005	- -	0.001	0.006
			2,3,7,8-TCDD TEQ	9.E-08	- -	8.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.007	- -	0.01	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	8.E-08	- -	5.E-07	6.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	7.E-07	8.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		2	--	1	4
	Exposure Medium Total						1.E-05						4
Sediment Total							7.E-05						4

TABLE 9.34

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	3.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.003
			Chromium (Hexavalent)	6.E-08	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0001	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.01	0.06
			High Risk PCBs	9.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	2.E-07	--	1.E-06	1.E-06	Chemical Total		0.05	--	0.01	0.07
	Exposure Medium Total						1.E-06						0.07
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	4.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.004
			Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported	0.007	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00004	0.0002
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0003	- -	0.1	0.1
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.1	--	1	2
	Exposure Medium Total						8.E-05						2
Surface Water Total							8.E-05						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aluminum	Background Constituent			0.E+00	Aluminum	Neurological	Background Constituent			0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Background Constituent			0.E+00	Cobalt	Thyroid	Background Constituent			0
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Background Constituent			0.E+00	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	1.E-06			1.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	9.E-04	--	--	9.E-04	Chemical Total		59	--	--	59
	Exposure Medium Total						9.E-04						59

TABLE 9.34

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			0
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.2
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.05	- -	- -	0.05
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			0.E+00	Cadmium	Kidneys	Background Constituent			0
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	8.E-07			8.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	2.E-04	--	--	2.E-04	Chemical Total		7	--	--	7
	Exposure Medium Total						2.E-04						7
Tissue Ingestion Total							1.E-03						67

Total Risk Across All Media	2.E-03

Total Hazard Index Across All Media	74

Total Neurological HI =	0.6
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.5
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.1
Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Longevity HI =	0.1
Total Kidneys HI =	0.01
Total Gastrointestinal Tract HI =	0.5
Total None Reported HI =	0.5
Total Thyroid HI =	4
Total Reproductive Effects HI =	0.000
Total Hair HI =	1
Total Teeth HI =	0.0
Total Development HI =	66
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.35
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)anthracene	1.E-08	- -	6.E-09	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-07	- -	6.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0006	0.002
			Benzo(b)fluoranthene	1.E-08	- -	7.E-09	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	5.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0001	- -	0.00006	0.0002
			Dibenzo(a,h)anthracene	3.E-08	- -	2.E-08	5.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	7.E-09	- -	4.E-09	1.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	9.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-07	- -	2.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.02	- -	0.01	0.04
			Aroclor 1260	7.E-07	- -	4.E-07	1.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.0008	0.02
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.02	- -	0.005	0.02
			Arsenic	8.E-07	- -	2.E-07	9.E-07	Arsenic	Skin, Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0004	- -	0.0003	0.0007
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.00005	- -	0.0002	0.0002
			Chromium (Hexavalent)	5.E-07	- -	9.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.04
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.006	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.004	- -	0.004	0.008
			Silver	NV	- -	NV	NV	Silver	Skin	0.0004	- -	0.0004	0.0008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.01	- -	0.02	0.03
			Zinc	NV	- -	NV	NV	Zinc	Blood, limmune system	0.005	- -	0.0002	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0032	0.008
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development	0.07	- -	0.0	0.1
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.7	- -	0.1	1
	Exposure Medium Total						2.E-03						1

TABLE 9.35
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Air	Volatile and Fugitive Dust Emissions											
			Benzo(a)anthracene	- -	2.E-10	- -	2.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	6.E-12	- -	6.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.00002	- -	0.00002
			Benzo(b)fluoranthene	- -	7.E-13	- -	7.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-13	- -	2.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	2.E-12	- -	2.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	4.E-13	- -	4.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-08	- -	3.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	2.E-08	- -	2.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	9.E-08	- -	9.E-08	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0004	- -	0.0004
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-10	- -	4.E-10	Arsenic	ardiovascular system, Nervous s	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00002	- -	0.00002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	9.E-09	- -	9.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000004	- -	0.000004
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.0005	- -	0.0005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0003	- -	0.0003
			Nickel	- -	5.E-10	- -	5.E-10	Nickel	Respiratory System	- -	0.00008	- -	0.00008
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00005	- -	0.00005
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.07	- -	0.07
			Dioxin-like PCBs	- -	3.E-08	- -	3.E-08	Dioxin-like PCBs	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.00008	- -	0.00008
			2,3,7,8-TCDD TEQ	- -	7.E-08	- -	7.E-08	2,3,7,8-TCDD TEQ	Liver, Development, Reproduction, Endocrine, Respiratory, Blood Production	- -	0.0002	- -	0.0002
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	4.E-08	- -	4.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	4.E-10	- -	4.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	4.E-07	--	4.E-07	Chemical Total		--	0.08	--	0.08
	Exposure Medium Total						4.E-07						0.08
Soil Total							2.E-03						1

TABLE 9.35

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	4.E-08	6.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	4.E-07	- -	3.E-07	7.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Dioxin-like PCBs	4.E-07	- -	9.E-07	1.E-06	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	9.E-08	- -	5.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.00	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	6.E-06	--	4.E-05	4.E-05	Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total						4.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-09	- -	1.E-08	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	5.E-09	- -	1.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	3.E-07	4.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	3.E-07	- -	8.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	8.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	9.E-08	- -	2.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	6.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.003	- -	0.0006	0.004
			2,3,7,8-TCDD TEQ	1.E-07	- -	7.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.003	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			0
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		2	--	0.5	2
	Exposure Medium Total						1.E-05						2
Sediment Total							6.E-05						2

TABLE 9.35

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	4.E-08	- -	4.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.00009	- -	0.0009	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	1.E-10	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	3.E-07	--	4.E-07	7.E-07	Chemical Total		0.04	--	0.01	0.04
	Exposure Medium Total						7.E-07						0.04
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	Background Constituent			0.E+00	Thallium	Hair	Background Constituent			0
			Cyanide	Background Constituent			0.E+00	Cyanide	Reproductive Effects	Background Constituent			0
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	5.E-05	Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total						5.E-05						0.7
Surface Water Total							5.E-05						0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aluminum	Background Constituent			0.E+00	Aluminum	Neurological	Background Constituent			0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Background Constituent			0.E+00	Cobalt	Thyroid	Background Constituent			0
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Background Constituent			0.E+00	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	2.E-03	--	--	2.E-03	Chemical Total		59	--	--	59
	Exposure Medium Total						2.E-03						59

TABLE 9.35

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			0
			Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			0.E+00	Cadmium	Kidneys	Background Constituent			0
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Background Constituent			0.E+00	Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Background Constituent			0.E+00	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	5.E-04	--	--	5.E-04	Chemical Total		9	--	--	9
	Exposure Medium Total						5.E-04						9
Tissue Ingestion Total							3.E-03						68

Total Risk Across All Media: 5.E-03

Total Hazard Index Across All Media: 72

Total Neurological HI =	0.6
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.5
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.03
Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Longevity HI =	0.04
Total Kidneys HI =	0.006
Total Gastrointestinal Tract HI =	0.4
Total None Reported HI =	0.3
Total Thyroid HI =	3
Total Reproductive Effects HI =	0.0002
Total Hair HI =	0.4
Total Teeth HI =	0.0
Total Development HI =	65
Total Fetotoxicity HI =	0.00003
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.0009
Total Endocrine System HI =	0.0002

TABLE 9.36
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			1,2,4-Trichlorobenzene	4.E-11	- -	5.E-12	4.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.0000004	- -	0.00000005	0.0000004
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.001	- -	0.0002	0.001
			1,4-Dichlorobenzene	1.E-09	- -	6.E-10	2.E-09	1,4-Dichlorobenzene	Liver	0.00001	- -	0.000005	0.00002
			Benzo(a)anthracene	3.E-08	- -	1.E-08	4.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-07	- -	1.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Benzo(b)fluoranthene	2.E-08	- -	1.E-08	3.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	2.E-08	- -	8.E-09	3.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0002	- -	0.00008	0.0003
			Dibenzo(a,h)anthracene	6.E-08	- -	3.E-08	1.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	1.E-08	- -	8.E-09	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-08	- -	4.E-09	1.E-08	Dieldrin	Liver	0.00004	- -	0.00001	0.00005
			4,4'-DDT	3.E-10	- -	4.E-11	4.E-10	4,4'-DDT	Liver	0.000005	- -	0.0000007	0.000006
			Heptachlor epoxide	2.E-08	- -	1.E-08	3.E-08	Heptachlor epoxide	Liver	0.0005	- -	0.0002	0.0008
			Aroclor 1248	5.E-05	- -	3.E-05	8.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-05	- -	2.E-05	5.E-05	Aroclor 1254	Eyes, nails, immune system	2	- -	1	4
			Aroclor 1260	2.E-05	- -	9.E-06	2.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-04	- -	2.E-04	6.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.02	- -	0.001	0.03
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.05	- -	0.01	0.07
			Arsenic	3.E-06	- -	7.E-07	4.E-06	Arsenic	Skin/Vascular	0.02	- -	0.005	0.03
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.001	- -	0.0008	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0007	- -	0.004	0.005
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.02	- -	0.003	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.001	- -	0.004	0.005
			Chromium (Hexavalent)	7.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.002	0.003
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.4	- -	0.02	0.5
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.09	- -	0.004	0.10
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0005	- -	0.00002	0.0005
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.01	- -	0.02	0.03
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.02	- -	0.02	0.05
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0006	- -	0.00002	0.0006
			Silver	NV	- -	NV	NV	Silver	Skin	0.0007	- -	0.0007	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.02	- -	0.02	0.04
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.01	- -	0.0006	0.01
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.01	- -	0.0071	0.02
			Dioxin-like PCBs	3.E-05	- -	2.E-05	6.E-05	Dioxin-like PCBs	Development	1	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-05	- -	1.E-06	1.E-05	2,3,7,8-TCDD TEQ	Development	0.3	- -	0.04	0.4
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	2.E-04	- -	6.E-03	6.E-03	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	3.E-04	- -	5.E-06	3.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	2.E-04	- -	8.E-03	8.E-03	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	5.E-05	- -	1.E-03	2.E-03	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	1.E-03	- -	2.E-02	2.E-02	Chemical Total	- -	5	- -	2	7
	Exposure Medium Total						2.E-02						7

TABLE 9.36
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.00002	- -	0.00002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.02	- -	0.02
			1,4-Dichlorobenzene	- -	7.E-08	- -	7.E-08	1,4-Dichlorobenzene	Liver	- -	0.00002	- -	0.00002
			Benzo(a)anthracene	- -	9.E-10	- -	9.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-11	- -	3.E-11	Benzo(a)pyrene	Fetotoxicity	- -	0.00006	- -	0.00006
			Benzo(b)fluoranthene	- -	2.E-12	- -	2.E-12	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	6.E-13	- -	6.E-13	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	7.E-12	- -	7.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-12	- -	2.E-12	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-13	- -	6.E-13	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-14	- -	2.E-14	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-12	- -	1.E-12	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	5.E-06	- -	5.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-06	- -	3.E-06	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	8.E-07	- -	8.E-07	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners		5.E-05		5.E-05	High Risk PCB Congeners	NA		NV		NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.001	- -	0.001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-09	- -	3.E-09	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0001	- -	0.0001
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.0001	- -	0.0001
			Beryllium	- -	2.E-10	- -	2.E-10	Beryllium	Respiratory system, Immune system	- -	0.00001	- -	0.00001
			Cadmium	- -	2.E-09	- -	2.E-09	Cadmium	Kidneys	- -	0.0003	- -	0.0003
			Chromium (Total)		NV		NV	Chromium (Total)	NA		NV		NV
			Chromium (Hexavalent)	- -	2.E-08	- -	2.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.000007	- -	0.000007
			Cobalt	- -	8.E-08	- -	8.E-08	Cobalt	Respiratory System	- -	0.004	- -	0.004
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide		NV		NV	Cyanide	Thyroid		0.00000007		0.00000007
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.001	- -	0.001
			Nickel	- -	7.E-09	- -	7.E-09	Nickel	Respiratory System	- -	0.0010	- -	0.0010
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.00000003	- -	0.00000003
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.0001	- -	0.0001
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.3	- -	0.3
			Dioxin-like PCBs	- -	1.E-06	- -	1.E-06	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.002	- -	0.002
			2,3,7,8-TCDD TEQ	- -	4.E-07	- -	4.E-07	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0007	- -	0.0007
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	4.E-07	- -	4.E-07	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	6.E-07	- -	6.E-07	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	5.E-07	- -	5.E-07	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV

TABLE 9.36
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worke
Receptor Age: Adul

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
			Radium-226	- -	2.E-07	- -	2.E-07	Radium-226	NA	- -	NV	- -	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			NV	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	--	6.6E-05	--	6.6E-05	Chemical Total		--	0.4	--	0.4
	Exposure Medium Total						7.E-05						0.4
Soil Total							2.E-02						7

Total Risk Across All Media: 2.E-02

Total Hazard Index Across All Media: 7

Total Neurological HI =	0.4
Total Body and Organ Weight HI =	0.05
Total Liver HI =	0.02
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.03
Total Adrenal Glands HI =	0.0000004
Total Eyes HI =	4
Total Immune System HI =	4
Total Nails HI =	4
Total Longevity HI =	0.07
Total Kidneys HI =	0.04
Total Gastrointestinal Tract HI =	0.2
Total None Reported HI =	0.008
Total Thyroid HI =	0.5
Total Reproductive Effects HI =	0.004
Total Hair HI =	0.4
Total Teeth HI =	0.0006
Total Development HI =	2
Total Urinary Tract HI =	0.00002
Total Fetotoxicity HI =	0.0002
Total Cardiovascular System HI =	0.0001
Total Respiratory System HI =	0.009
Total Endocrine System HI =	0.003

TABLE 9.37
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	3.E-11	- -	2.E-12	3.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.00000008	0.000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.004	- -	0.0003	0.004
			1,4-Dichlorobenzene	1.E-09	- -	2.E-10	1.E-09	1,4-Dichlorobenzene	Liver	0.00003	- -	0.000007	0.00004
			Benzo(a)anthracene	9.E-08	- -	3.E-08	1.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-07	- -	3.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.002	0.008
			Benzo(b)fluoranthene	6.E-08	- -	2.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	3.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0005	- -	0.0001	0.0007
			Dibenzo(a,h)anthracene	2.E-07	- -	7.E-08	3.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-08	- -	2.E-08	7.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	7.E-09	- -	2.E-09	8.E-09	Dieldrin	Liver	0.00010	- -	0.00002	0.0001
			4,4'-DDT	2.E-10	- -	2.E-11	2.E-10	4,4'-DDT	Liver	0.00002	- -	0.000001	0.00002
			Heptachlor epoxide	2.E-08	- -	4.E-09	2.E-08	Heptachlor epoxide	Liver	0.002	- -	0.0004	0.002
			Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.07	- -	0.002	0.07
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.1	- -	0.02	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular	0.06	- -	0.007	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.004	- -	0.001	0.005
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.002	- -	0.007	0.009
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.003	0.007
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.006	0.3
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.001	- -	0.00003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.2	- -	0.006	0.2
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.04	- -	0.03	0.07
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.06	- -	0.04	0.1
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00004	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.001	0.003
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.04	- -	0.04	0.08
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.04	- -	0.0009	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.03	- -	0.0113	0.04
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0	1
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	14	- -	3	17
	Exposure Medium Total						1.E-03						17

TABLE 9.37
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	2.E-09	- -	2.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	5.E-12	- -	5.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	3.E-13	- -	3.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-14	- -	2.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-12	- -	1.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	3.E-13	- -	3.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-14	- -	2.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	6.E-16	- -	6.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	4.E-14	- -	4.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-07	- -	2.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	9.E-08	- -	9.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-08	- -	3.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	7.E-12	- -	7.E-12	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	4.E-09	- -	4.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00000001	- -	0.00000001
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	4.E-08	- -	4.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	1.E-08	- -	1.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-09	- -	2.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	3.E-09	- -	3.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	9.E-10	- -	9.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						2.E-06						0.05
Soil Total							1.E-03						17

TABLE 9.37
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.0
			Dioxin-like PCBs	1.E-06	- -	6.E-07	2.E-06	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	3.E-07	- -	3.E-08	3.E-07	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	5.E-07	7.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		1	--	0.3	1
	Exposure Medium Total						1.E-04						1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-07	- -	1.E-07	4.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	3.E-07	- -	2.E-07	5.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.03	- -	0.02	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	5.E-08	5.E-07	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.006	0.06
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	1.E-07	- -	4.E-07	5.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	5.E-07	6.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		17	--	1	18
	Exposure Medium Total						2.E-05						18
Sediment Total							1.E-04						20
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	2.E-10	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	7.E-07	--	1.E-06	2.E-06	Chemical Total		0.2	--	0.01	0.2
	Exposure Medium Total						2.E-06						0.2

TABLE 9.37
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	2.E-08	4.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.0
			Cyanide	Background Constituent			NV	Cyanide	Reproductive Effects	Background Constituent			0.000
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			High Risk PCBs	2.E-08	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0009	- -	0.09	0.09
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.5	--	1	2
	Exposure Medium Total						9.E-05						2
Surface Water Total							1.E-04						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs	1.E-04	- -	- -	1.E-04	High Risk PCBs		NV	--	:--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	Background Constituent			NV	Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	Background Constituent			0.0
			Copper	NV	- -	- -	NV	Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Background Constituent			NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0.0
			Bismuth-214	2.E-05	- -	- -	2.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-05	- -	- -	2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-07	- -	- -	3.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		101	--	--	101
	Exposure Medium Total						1.E-03						101

TABLE 9.37
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.3	- -	- -	0.26
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	7.E-06	- -	- -	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			NV	Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	4.E-06	- -	- -	4.E-06	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	Background Constituent			NV	Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	2.E-07			2.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	1.E-04	--	--	1.E-04	Chemical Total		11	--	--	11
	Exposure Medium Total						1.E-04						11
Tissue Ingestion Total							1.E-03						112

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 150

Total Neurological HI =	1
Total Body and Organ Weight HI =	0.7
Total Liver HI =	1
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.2
Total Adrenal Glands HI =	0.000001
Total Eyes HI =	11
Total Immune System HI =	11
Total Nails HI =	11
Total Longevity HI =	0.3
Total Kidneys HI =	0.1
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.6
Total Thyroid HI =	19
Total Reproductive Effects HI =	0.002
Total Hair HI =	2
Total Teeth HI =	0.0
Total Development HI =	114
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.38

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.002	- -	0.001	0.003
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Hexavalent)	None Reported	0.1	- -	0.2	0.3
			Cobalt	Thyroid	0.6	- -	0.02	0.7
			Thallium	Hair	Background Constituent			0.0
			Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			2,3,7,8-TCDD TEQ	Development	0.04	- -	0.004	0.04
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		1	--	0.3	1
	Exposure Medium Total							1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.07	- -	0.04	0.1
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.1	- -	0.03	0.1
			Arsenic	Skin, Vascular	0.05	- -	0.009	0.06
			Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	Thyroid	16	- -	0.6	16
			Copper	Gastrointestinal Tract	0.02	- -	0.0006	0.02
			Iron	Gastrointestinal Tract	0.08	- -	0.003	0.08
			Nickel	Body and Organ Weights	0.3	- -	0.3	0.6
			Thallium	Hair	0.7	- -	0.03	0.7
			Mercury	Autoimmune Effects	0.03	- -	0.02	0.05
			2,3,7,8-TCDD TEQ	Development	0.05	- -	0.01	0.06
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		17	--	1	18
	Exposure Medium Total							18
Sediment Total								20

TABLE 9.38

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	None Reported	0.0005	- -	0.002	0.002
			Iron	Gastrointestinal Tract	0.0006	- -	0.00003	0.0006
			Thallium	Hair	0.2	- -	0.009	0.2
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total		0.2	--	0.01	0.2
	Exposure Medium Total							0.2
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	Skin, Vascular	0.01	- -	0.0005	0.01
			Chromium (Hexavalent)	None Reported	0.02	- -	0.09	0.1
			Cobalt	Thyroid	0.5	- -	0.009	0.5
			Iron	Gastrointestinal Tract	0.0007	- -	0.00003	0.0008
			Thallium	Hair	Background Constituent			0.0
			Cyanide	Reproductive Effects	Background Constituent			0.000
			Dioxin-Like PCBs	Development	0.004	- -	1	1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.5	--	1	2
	Exposure Medium Total							2
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.3	- -	- -	0.3
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	Background Constituent			0.0
			4,4'-DDE	Liver	Background Constituent			0.0
			4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.02	- -	- -	0.02
			Cobalt	Thyroid	Background Constituent			0
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.9	- -	- -	0.9
			Manganese	Neurological	0.9	- -	- -	0.9
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Blood, Immune System	Background Constituent			0
			Dioxin-like PCBs	Development	8	- -	- -	8
			2,3,7,8-TCDD TEQ	Development	227	- -	- -	227
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		237	--	--	237
	Exposure Medium Total							237

TABLE 9.38

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	Liver	0.2	- -	- -	0.2
			Dieldrin	Liver	Background Constituent			0.0
			4,4'-DDD	Liver	NV	- -	- -	NV
			4,4'-DDE	Liver	NV	- -	- -	NV
			Heptachlor epoxide	Liver	0.6	- -	- -	0.6
			Aroclor 1254	Eyes, Nails, Immune System	8	- -	- -	8
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Kidneys	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.4	- -	- -	0.4
			Cobalt	Thyroid	2	- -	- -	2
			Copper	Gastrointestinal Tract	Background Constituent			0
			Iron	Gastrointestinal Tract	0.5	- -	- -	0.5
			Zinc	Blood, Immune System	Background Constituent			0
			Mercury	Development, Neurological	1	- -	- -	1
			Dioxin-like PCBs	Development	19	- -	- -	19
			2,3,7,8-TCDD TEQ	Development	6	- -	- -	6
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		38	--	--	38
	Exposure Medium Total							38
Tissue Ingestion Total								275

Total Hazard Index Across All Media	296
Total Neurological HI =	2
Total Body and Organ Weight HI =	0.6
Total Liver HI =	1
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.1
Total Eyes HI =	8
Total Immune System HI =	8
Total Nails HI =	8
Total Longevity HI =	0.1
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.9
Total Thyroid HI =	20
Total Reproductive Effects HI =	0.000
Total Hair HI =	1
Total Teeth HI =	0.0
Total Development HI =	263

TABLE 9.39

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-12	- -	3.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000009	0.0000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0005	- -	0.0003	0.0008
			1,4-Dichlorobenzene	2.E-10	- -	4.E-10	6.E-10	1,4-Dichlorobenzene	Liver	0.000004	- -	0.000009	0.00001
			Benzo(a)anthracene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-08	- -	2.E-07	3.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.002	0.003
			Benzo(b)fluoranthene	6.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	5.E-09	8.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00007	- -	0.0002	0.0002
			Dibenzo(a,h)anthracene	2.E-08	- -	6.E-08	8.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-09	- -	1.E-08	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	3.E-09	4.E-09	Dieldrin	Liver	0.00001	- -	0.00003	0.00004
			4,4'-DDT	5.E-11	- -	3.E-11	8.E-11	4,4'-DDT	Liver	0.000002	- -	0.000001	0.000003
			Heptachlor epoxide	3.E-09	- -	7.E-09	1.E-08	Heptachlor epoxide	Liver	0.0002	- -	0.0004	0.0006
			Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.010	- -	0.002	0.01
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.02	- -	0.03	0.05
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin/Vascular	0.008	- -	0.009	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0005	- -	0.001	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0003	- -	0.008	0.008
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.006	- -	0.005	0.011
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0004	- -	0.007	0.007
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.004	0.005
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.04	- -	0.008	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0002	- -	0.00004	0.0002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.03	- -	0.007	0.04
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.03	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.009	- -	0.04	0.05
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0002	- -	0.00004	0.0003
			Silver	NV	- -	NV	NV	Silver	Skin	0.0003	- -	0.001	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.03	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.006	- -	0.05	0.05
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.005	- -	0.001	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0134	0.018
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0.1	0.2
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	6
	Exposure Medium Total						1.E-03						6

TABLE 9.39
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	3.E-09	- -	3.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	3.E-14	- -	3.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	9.E-13	- -	9.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	3.E-14	- -	3.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	9.E-16	- -	9.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	6.E-14	- -	6.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-07	- -	3.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-07	- -	1.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-08	- -	4.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	1.E-11	- -	1.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	4.E-10	- -	4.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	6.E-08	- -	6.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	7.E-09	- -	7.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	9.E-09	- -	9.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	8.E-09	- -	8.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	3.E-09	- -	3.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						3.E-06						0.05
Soil Total							1.E-03						6

TABLE 9.39
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.001	0.002
			Arsenic	2.E-07	- -	4.E-07	6.E-07	Arsenic	Skin, Vascular	0.004	- -	0.006	0.01
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.03	0.1
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Dioxin-like PCBs	2.E-07	- -	1.E-06	1.E-06	Dioxin-like PCBs	Development	0.02	- -	0.09	0.1
			2,3,7,8-TCDD TEQ	6.E-08	- -	6.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.005	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	5.E-06	--	5.E-05	6.E-05	Chemical Total		0.1	--	0.3	0.5
	Exposure Medium Total						6.E-05						0.5
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	9.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.010	- -	0.04	0.05
			Aroclor 1260	6.E-08	- -	3.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.03	0.04
			Arsenic	4.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.007	- -	0.01	0.02
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0005	- -	0.01	0.01
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0007	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.003	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.04	- -	0.3	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.10	- -	0.03	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.005	- -	0.02	0.02
			2,3,7,8-TCDD TEQ	9.E-08	- -	8.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.007	- -	0.007	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	8.E-08	- -	5.E-07	6.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	1.E-07	- -	7.E-07	8.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		2	--	1	4
	Exposure Medium Total						1.E-05						4
Sediment Total							7.E-05						4
Surface Water	Paradise Creek	Paradise Creek	Arsenic	2.E-07	- -	3.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.003
			Chromium (Hexavalent)	6.E-08	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0001	- -	0.002	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00003	0.0002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.01	0.06
			High Risk PCBs	9.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	2.E-07	--	1.E-06	1.E-06	Chemical Total		0.05	--	0.01	0.07
	Exposure Medium Total						1.E-06						0.07
Surface Water	Estuarine Wetland	Estuarine Wetland	Arsenic	2.E-07	- -	4.E-08	2.E-07	Arsenic	Skin, Vascular	0.003	- -	0.0006	0.004
			Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0002	- -	0.00004	0.0002
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Cyanide	Background Constituent			NV	Cyanide	Reproductive Effects	Background Constituent			0.000
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0003	- -	0.1	0.1
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.1	--	1	2
	Exposure Medium Total						8.E-05						2
Surface Water Total							8.E-05						2

TABLE 9.39
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0.0
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			Aluminum	Background Constituent			NV	Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Background Constituent			NV	Cobalt	Thyroid	Background Constituent			0.0
			Copper	Background Constituent			NV	Copper	Gastrointestinal Tract	Background Constituent			0.00
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Background Constituent			NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0.0
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	1.E-06			1.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	9.E-04	--	--	9.E-04	Chemical Total		59	--	--	59
	Exposure Medium Total						9.E-04						59

TABLE 9.39

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	2.E-07	- -	- -	2.E-07	4,4'-DDD	Liver	0.2	- -	- -	0.2
			4,4'-DDE	6.E-07	- -	- -	6.E-07	4,4'-DDE	Liver	0.05	- -	- -	0.05
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			NV	Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.08
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Copper	Background Constituent			NV	Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	8.E-07			8.E-07	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	1.E-04	--	--	1.E-04	Chemical Total		7	--	--	7
	Exposure Medium Total						1.E-04						7
Tissue Ingestion Total							1.E-03						67

Total Risk Across All Media	2.E-03

Total Hazard Index Across All Media	78
Total Neurological HI =	0.5
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.5
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.1
Total Adrenal Glands HI =	0.0000002
Total Eyes HI =	5
Total Immune System HI =	5
Total Nails HI =	5
Total Longevity HI =	0.09
Total Kidneys HI =	0.0
Total Gastrointestinal Tract HI =	0
Total None Reported HI =	0.5
Total Thyroid HI =	4
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.4
Total Teeth HI =	0.0
Total Development HI =	67
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.40
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	8.E-12	- -	1.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000001	0.0000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0003	- -	0.00004	0.0004
			1,4-Dichlorobenzene	3.E-10	- -	1.E-10	4.E-10	1,4-Dichlorobenzene	Liver	0.000003	- -	0.000001	0.000004
			Benzo(a)anthracene	6.E-09	- -	3.E-09	9.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0006	- -	0.0003	0.0009
			Benzo(b)fluoranthene	4.E-09	- -	2.E-09	6.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-09	- -	2.E-09	6.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00005	- -	0.00002	0.00007
			Dibenzo(a,h)anthracene	1.E-08	- -	7.E-09	2.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	3.E-09	- -	2.E-09	5.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	2.E-09	- -	9.E-10	3.E-09	Dieldrin	Liver	0.000009	- -	0.000004	0.00001
			4,4'-DDT	7.E-11	- -	9.E-12	8.E-11	4,4'-DDT	Liver	0.000001	- -	0.0000002	0.000002
			Heptachlor epoxide	5.E-09	- -	2.E-09	7.E-09	Heptachlor epoxide	Liver	0.0001	- -	0.00006	0.0002
			Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system	0.6	- -	0.4	1
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.007	- -	0.0003	0.007
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.01	- -	0.004	0.02
			Arsenic	7.E-07	- -	2.E-07	9.E-07	Arsenic	Skin/Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0003	- -	0.0002	0.0006
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0002	- -	0.001	0.001
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.0010	0.001
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0003	- -	0.0006	0.0009
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0001	- -	0.000005	0.0001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.02	- -	0.0009	0.02
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.004	- -	0.004	0.008
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.006	- -	0.006	0.01
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0001	- -	0.000006	0.0002
			Silver	NV	- -	NV	NV	Silver	Skin	0.0002	- -	0.0002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.004	0.09
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.004	- -	0.007	0.01
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.003	- -	0.0001	0.004
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.003	- -	0.0019	0.005
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development	0.3	- -	0	0
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.09	- -	0.0	0.1
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						2.E-03						2

TABLE 9.40
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	7.E-09	- -	7.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	9.E-11	- -	9.E-11	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	7.E-14	- -	7.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	8.E-13	- -	8.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-14	- -	6.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-15	- -	2.E-15	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-13	- -	1.E-13	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	6.E-07	- -	6.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-07	- -	3.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-08	- -	9.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-10	- -	3.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	2.E-11	- -	2.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	9.E-09	- -	9.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	1.E-07	- -	1.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	4.E-08	- -	4.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	6.E-09	- -	6.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	7.E-06	--	7.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						7.E-06						0.05
Soil Total							2.E-03						2

TABLE 9.40
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	4.E-08	6.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	4.E-07	- -	3.E-07	7.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Dioxin-like PCBs	4.E-07	- -	9.E-07	1.E-06	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	9.E-08	- -	5.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.002	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	6.E-06	--	4.E-05	4.E-05	Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total						4.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-09	- -	1.E-08	2.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	5.E-09	- -	1.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	3.E-07	4.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	3.E-07	- -	8.E-07	1.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	8.E-08	- -	2.E-07	3.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	9.E-08	- -	2.E-07	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	6.E-07	- -	6.E-07	1.E-06	Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.003	- -	0.0081	0.011
			2,3,7,8-TCDD TEQ	1.E-07	- -	7.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.005	- -	0.003	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not Site Related			0.E+00	Radium-226	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		2	--	0.5	2
	Exposure Medium Total						1.E-05						2
Sediment Total							6.E-05						2
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	4.E-08	- -	4.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0001	- -	0.0009	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	1.E-10	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	3.E-07	--	4.E-07	7.E-07	Chemical Total		0.04	--	0.01	0.04
	Exposure Medium Total						7.E-07						0.04

TABLE 9.40
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	3.E-08	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Cyanide	Background Constituent			NV	Cyanide	Reproductive Effects	Background Constituent			0.0000
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	1.E-06	1.E-06	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	5.E-05	Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total						5.E-05						0.7
Surface Water Total							5.E-05						0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Background Constituent			0.E+00	4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Background Constituent			0.E+00	4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Background Constituent			0.E+00	4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Background Constituent			0.E+00	Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Aluminum	Background Constituent			NV	Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Background Constituent			NV	Cobalt	Thyroid	Background Constituent			0.0
			Copper	Background Constituent			NV	Copper	Gastrointestinal Tract	Background Constituent			0.00
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	NV	- -	- -	NV	Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Background Constituent			NV	Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0.0
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	2.E-03	--	--	2.E-03	Chemical Total		59	--	--	59
	Exposure Medium Total						2.E-03						59

TABLE 9.40
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Background Constituent			0.E+00	Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	4.E-07	- -	- -	4.E-07	4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Background Constituent			NV	Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.09
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Background Constituent			NV	Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Background Constituent			NV	Zinc	Blood, Immune System	Background Constituent			0
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137		Not Site Related			NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40		Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228		Not Site Related			NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235		Not Site Related			NV
			Chemical Total	5.E-04	--	--	5.E-04	Chemical Total		9	--	--	9
	Exposure Medium Total						5.E-04						9
Tissue Ingestion Total							3.E-03						68

Total Risk Across All Media	5.E-03
Total Hazard Index Across All Media	73

Total Neurological HI =	0.5
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.5
Total Blood HI =	0.0
Total Skin/Vascular HI =	0.0
Total Adrenal Glands HI =	0.0000001
Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Longevity HI =	0.04
Total Kidneys HI =	0.0
Total Gastrointestinal Tract HI =	0.4
Total None Reported HI =	0.3
Total Thyroid HI =	3
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.2
Total Teeth HI =	0.0
Total Development HI =	66
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.41

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0002	- -	0.0005	0.0007
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.005
			Chromium (Hexavalent)	None Reported	0.01	- -	0.08	0.09
			Cobalt	Thyroid	0.06	- -	0.01	0.07
			Thallium	Hair	Background constituent			0.00
			Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	Development	0.004	- -	0.002	0.01
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	NV	- -	NV	NV
			Lead-214	NA	Not Site Related			NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		0.1	--	0.1	0.2
	Exposure Medium Total							0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.007	- -	0.02	0.02
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	Skin, Vascular	0.005	- -	0.004	0.009
			Chromium (Total)	None Reported	0.0003	- -	0.005	0.005
			Chromium (Hexavalent)	None Reported	0.002	- -	0.01	0.01
			Cobalt	Thyroid	1	- -	0.3	2
			Copper	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Iron	Gastrointestinal Tract	0.007	- -	0.001	0.009
			Nickel	Body and Organ Weights	0.03	- -	0.1	0.2
			Thallium	Hair	0.07	- -	0.01	0.08
			Mercury	Autoimmune Effects	0.003	- -	0.0081	0.011
			2,3,7,8-TCDD TEQ	Development	0.005	- -	0.003	0.01
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		2	--	0.5	2
	Exposure Medium Total							2
Sediment Total								2

TABLE 9.41

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	None Reported	0.00009	- -	0.0009	0.0009
			Iron	Gastrointestinal Tract	0.0001	- -	0.00001	0.0001
			Thallium	Hair	0.03	- -	0.004	0.04
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total		0.04	--	0.01	0.04
	Exposure Medium Total							0.04
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	Skin, Vascular	0.002	- -	0.0002	0.002
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.09	- -	0.004	0.09
			Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0002
			Thallium	Hair	Background constituent			0.00
			Cyanide	Reproductive Effects	Background constituent			0.0000
			Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.04	0.04
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.1	--	0.6	0.7
	Exposure Medium Total							0.7
Surface Water Total								0.7
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.4	- -	- -	0.4
			Dieldrin	Liver	Background constituent			0.0
			4,4'-DDD	Liver	Background constituent			0.0
			4,4'-DDE	Liver	Background constituent			0.0
			4,4'-DDT	Liver	Background constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background constituent			0
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	Background constituent			0.0
			Arsenic	Skin, Vascular	Background constituent			0
			Chromium (Hexavalent)	None Reported	0.02	- -	- -	0.02
			Cobalt	Thyroid	Background constituent			0
			Copper	Gastrointestinal Tract	Background constituent			0.0
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Manganese	Neurological	1	- -	- -	1
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background constituent			0.0
			Zinc	Blood, Immune System	Background constituent			0
			Dioxin-like PCBs	Development	10	- -	- -	10
			2,3,7,8-TCDD TEQ	Development	270	- -	- -	270
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		282	--	--	282
	Exposure Medium Total							282

TABLE 9.41

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background constituent			NV
			Aldrin	Liver	0.3	- -	- -	0.3
			Dieldrin	Liver	Background constituent			0.0
			4,4'-DDD	Liver	2	- -	- -	2
			4,4'-DDE	Liver	0.5	- -	- -	0.5
			Heptachlor epoxide	Liver	1	- -	- -	1
			Aroclor 1254	Eyes, Nails, Immune System	14	- -	- -	14
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	Background constituent			0
			Cadmium	Kidneys	Background constituent			0
			Chromium (Hexavalent)	None Reported	0.8	- -	- -	0.8
			Cobalt	Thyroid	4	- -	- -	4
			Copper	Gastrointestinal Tract	Background constituent			0
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Zinc	Blood, Immune System	Background constituent			0
			Mercury	Development, Neurological	2	- -	- -	2
			Dioxin-like PCBs	Development	36	- -	- -	36
			2,3,7,8-TCDD TEQ	Development	11	- -	- -	11
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		71	--	--	71
	Exposure Medium Total							71
Tissue Ingestion Total								354

Total Hazard Index Across All Media	357

Total Neurological HI =	3
Total Body and Organ Weight HI =	0.2
Total Liver HI =	4
Total Blood HI =	0.0
Total Skin/Vascular HI =	0.0
Total Eyes HI =	14
Total Immune System HI =	14
Total Nails HI =	14
Total Longevity HI =	0.02
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.9
Total Thyroid HI =	6
Total Reproductive Effects HI =	0.000
Total Hair HI =	0.1
Total Teeth HI =	0.0
Total Development HI =	329

TABLE 9.42

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	3.E-07	- -	2.E-07	6.E-07
			Arsenic	2.E-06	- -	5.E-07	2.E-06
			Chromium (Hexavalent)	9.E-05	- -	2.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	Background constituent			NV
			Dioxin-like PCBs	2.E-06	- -	2.E-06	3.E-06
			2,3,7,8-TCDD TEQ	4.E-07	- -	8.E-08	5.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Cesium-137	Not Site Related			0.E+00
			Lead-212	Not Site Related			0.E+00
			Lead-214	4.E-07	- -	2.E-06	3.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			NV
			Chemical Total	9.E-05	--	2.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	1.E-07	- -	8.E-08	2.E-07
			Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Benzo(b)fluoranthene	9.E-08	- -	6.E-08	2.E-07
			Dibenzo(a,h)anthracene	2.E-06	- -	1.E-06	4.E-06
			Aroclor 1248	1.E-06	- -	1.E-06	3.E-06
			Aroclor 1254	3.E-07	- -	3.E-07	6.E-07
			Aroclor 1260	4.E-07	- -	4.E-07	8.E-07
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-06	- -	9.E-07	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	1.E-05	- -	3.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	6.E-07	- -	1.E-07	7.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Lead-212	Not Site Related			0.E+00
			Lead-214	3.E-07	- -	2.E-06	2.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-226	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	2.E-05	--	3.E-05	6.E-05
	Exposure Medium Total						6.E-05
Sediment Total							3.E-04

TABLE 9.42

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	7.E-07	- -	8.E-08	7.E-07
			Chromium (Hexavalent)	4.E-07	- -	2.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	3.E-10	- -	5.E-08	5.E-08
			2,3,7,8-TCDD TEQ	Background constituent			0.E+00
			Potassium-40	Not Site Related			0.E+00
			Chemical Total	1.E-06	--	2.E-06	3.E-06
	Exposure Medium Total						3.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	7.E-07	- -	8.E-08	8.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	Background constituent			NV
			Cyanide	Background constituent			NV
			Dioxin-Like PCBs	5.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	4.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	1.E-08	- -	3.E-06	3.E-06
			Radium-226	1.E-05	- -	2.E-10	1.E-05
			Chemical Total	3.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							1.E-04
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-05	- -	- -	2.E-05
			Dieldrin	Background constituent			0.E+00
			4,4'-DDD	Background constituent			0.E+00
			4,4'-DDE	Background constituent			0.E+00
			4,4'-DDT	Background constituent			0.E+00
			Aroclor 1254	Background constituent			0.E+00
			High Risk PCBs	2.E-03	- -	- -	2.E-03
			Aluminum	Background constituent			NV
			Arsenic	Background constituent			0.E+00
			Chromium (Hexavalent)	1.E-05	- -	- -	1.E-05
			Cobalt	Background constituent			NV
			Copper	Background constituent			NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	Background constituent			NV
			Zinc	Background constituent			NV
			Dioxin-like PCBs	3.E-04	- -	- -	3.E-04
			2,3,7,8-TCDD TEQ	9.E-03	- -	- -	9.E-03
			Bismuth-214	9.E-04	- -	- -	9.E-04
			Cesium-137	Not Site Related			0.E+00
			Lead-214	1.E-03	- -	- -	1.E-03
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	2.E-05	- -	- -	2.E-05
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	1.E-02	--	--	1.E-02
	Exposure Medium Total						1.E-02

TABLE 9.42

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background constituent			0.E+00
			Aldrin	5.E-05	- -	- -	5.E-05
			Dieldrin	Background constituent			0.E+00
			4,4'-DDD	4.E-06	- -	- -	4.E-06
			4,4'-DDE	2.E-05	- -	- -	2.E-05
			Heptachlor epoxide	4.E-05	- -	- -	4.E-05
			High Risk PCBs	5.E-04	- -	- -	5.E-04
			Aroclor 1254	2.E-04	- -	- -	2.E-04
			Arsenic	Background constituent			0.E+00
			Cadmium	Background constituent			NV
			Chromium (Hexavalent)	4.E-04	- -	- -	4.E-04
			Cobalt	NV	- -	- -	NV
			Copper	Background constituent			NV
			Iron	NV	- -	- -	NV
			Zinc	Background constituent			NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	1.E-03	- -	- -	1.E-03
			2,3,7,8-TCDD TEQ	3.E-04	- -	- -	3.E-04
			Bismuth-214	1.E-03	- -	- -	1.E-03
			Cesium-137	Not Site Related			0.E+00
			Lead-214	5.E-04	- -	- -	5.E-04
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	3.E-05	- -	- -	3.E-05
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	4.E-03	--	--	4.E-03
	Exposure Medium Total						4.E-03
Tissue Ingestion Total							2.E-02

2.E-02

TABLE 9.43
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	3.E-11	- -	2.E-12	3.E-11	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.00000008	0.000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.004	- -	0.0003	0.004
			1,4-Dichlorobenzene	1.E-09	- -	2.E-10	1.E-09	1,4-Dichlorobenzene	Liver	0.00003	- -	0.000007	0.00004
			Benzo(a)anthracene	9.E-08	- -	3.E-08	1.E-07	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-07	- -	3.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.002	0.008
			Benzo(b)fluoranthene	6.E-08	- -	2.E-08	8.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	1.E-08	- -	3.E-09	2.E-08	Bis(2-ethylhexyl)phthalate	Liver	0.0005	- -	0.0001	0.0007
			Dibenzo(a,h)anthracene	2.E-07	- -	7.E-08	3.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-08	- -	2.E-08	7.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	7.E-09	- -	2.E-09	8.E-09	Dieldrin	Liver	0.00010	- -	0.00002	0.0001
			4,4'-DDT	2.E-10	- -	2.E-11	2.E-10	4,4'-DDT	Liver	0.00002	- -	0.000001	0.00002
			Heptachlor epoxide	2.E-08	- -	4.E-09	2.E-08	Heptachlor epoxide	Liver	0.002	- -	0.0004	0.002
			Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.07	- -	0.002	0.07
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.1	- -	0.02	0.2
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular	0.06	- -	0.007	0.07
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.004	- -	0.001	0.005
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.002	- -	0.007	0.009
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.04	- -	0.004	0.05
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.003	0.007
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.006	0.3
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.001	- -	0.00003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.2	- -	0.006	0.2
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.04	- -	0.03	0.07
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.06	- -	0.04	0.1
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00004	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.001	0.003
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.04	- -	0.04	0.08
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.04	- -	0.0009	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.03	- -	0.0113	0.04
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0	1
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not site related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not site related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not site related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not site related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	14	- -	3	17
	Exposure Medium Total						1.E-03						17

TABLE 9.43
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions	1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	2.E-09	- -	2.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	5.E-12	- -	5.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	3.E-13	- -	3.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-14	- -	2.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-12	- -	1.E-12	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	3.E-13	- -	3.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-14	- -	2.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	6.E-16	- -	6.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	4.E-14	- -	4.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-07	- -	2.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	9.E-08	- -	9.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-08	- -	3.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-10	- -	1.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	7.E-12	- -	7.E-12	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	6.E-11	- -	6.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	4.E-09	- -	4.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	3.E-09	- -	3.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	2.E-10	- -	2.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	4.E-08	- -	4.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	1.E-08	- -	1.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not site related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-09	- -	2.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not site related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	3.E-09	- -	3.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not site related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	3.E-09	- -	3.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not site related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not site related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	9.E-10	- -	9.E-10	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not site related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not site related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not site related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not site related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						2.E-06						0.05
Soil Total							1.E-03						17
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	6.E-08	- -	6.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	6.E-08	--	6.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						6.E-08						0.009
Groundwater Total							6.E-08						0.009

TABLE 9.43
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	9.E-07	- -	4.E-07	1.E-06	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not Site Related			NV
			Chemical Total	1.E-05	--	1.E-05	2.E-05	Chemical Total		0.7	--	0.06	0.7
	Exposure Medium Total						2.E-05						0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background constituent			0.E+00	Arsenic	Skin, Vascular	Background constituent			0.00
			Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	8.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	9.E-08	- -	3.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	2.E-07	- -	5.E-07	7.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not site related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Chemical Total	3.E-06	--	5.E-06	8.E-06	Chemical Total		0.004	--	0.005	0.009
	Exposure Medium Total						8.E-06						0.009
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	7.E-08	2.E-07	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	6.E-07	- -	1.E-07	7.E-07	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Background constituent			NV	Thallium	Hair	Background constituent			0.00
			Dioxin-like PCBs	6.E-07	- -	3.E-07	9.E-07	Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	2.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not site related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.5	--	0.1	0.6
	Exposure Medium Total						1.E-04						0.6
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-07	- -	2.E-07	6.E-07	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	4.E-08	- -	2.E-08	6.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	1.E-06	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	5.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	1.E-07	- -	6.E-08	2.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	2.E-07	- -	8.E-08	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	1.E-06	- -	2.E-07	1.E-06	Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0085	0.03
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-08	2.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		9	--	0.5	9
	Exposure Medium Total						2.E-05						9
Sediment Total							1.E-04						11

TABLE 9.43
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	0.0016	- -	0.006	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	1	1
			Radium-226	1.E-06	- -	1.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	1.E-05	1.E-05	Chemical Total		0.10	--	1	1
	Exposure Medium Total						1.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.01	- -	0.0003	0.007
			Chromium (Hexavalent)	2.E-07	- -	8.E-07	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	1.E-10	- -	7.E-09	8.E-09	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background constituent			0.00
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	5.E-07	--	8.E-07	1.E-06	Chemical Total		0.1	--	0.01	0.1
	Exposure Medium Total						1.E-06						0.1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	3.E-07	- -	1.E-08	3.E-07	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Background constituent			NV	Thallium	Hair	Background constituent			0.00
			Cyanide	Background constituent			NV	Cyanide	Reproductive Effects	Background constituent			0.000
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	1.E-08	- -	8.E-07	8.E-07	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	5.E-09	- -	5.E-07	5.E-07	2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.3	--	0.8	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							8.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 30

Total Neurological HI =	0.2
Total Body and Organ Weight HI =	0.4
Total Liver HI =	0.01
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.2
Total Adrenal Glands HI =	0.000001
Total Eyes HI =	9
Total Immune System HI =	9
Total Nails HI =	9
Total Longevity HI =	0.2
Total Kidneys HI =	0.05
Total Gastrointestinal Tract HI =	0.6
Total None Reported HI =	0.3
Total Thyroid HI =	10
Total Reproductive Effects HI =	0.002
Total Hair HI =	2
Total Teeth HI =	0.002
Total Development HI =	7
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.44
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-12	- -	3.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000009	0.0000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0005	- -	0.0003	0.0008
			1,4-Dichlorobenzene	2.E-10	- -	4.E-10	6.E-10	1,4-Dichlorobenzene	Liver	0.000004	- -	0.000009	0.00001
			Benzo(a)anthracene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	8.E-08	- -	2.E-07	3.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.002	0.003
			Benzo(b)fluoranthene	6.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	5.E-09	8.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00007	- -	0.0002	0.0002
			Dibenzo(a,h)anthracene	2.E-08	- -	6.E-08	8.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	5.E-09	- -	1.E-08	2.E-08	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	3.E-09	4.E-09	Dieldrin	Liver	0.00001	- -	0.00003	0.00004
			4,4'-DDT	5.E-11	- -	3.E-11	8.E-11	4,4'-DDT	Liver	0.000002	- -	0.000001	0.000003
			Heptachlor epoxide	3.E-09	- -	7.E-09	1.E-08	Heptachlor epoxide	Liver	0.0002	- -	0.0004	0.0006
			Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.010	- -	0.002	0.01
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.02	- -	0.03	0.05
			Arsenic	5.E-07	- -	5.E-07	1.E-06	Arsenic	Skin/Vascular	0.008	- -	0.009	0.02
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0005	- -	0.001	0.002
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0003	- -	0.008	0.008
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.006	- -	0.005	0.011
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0004	- -	0.007	0.007
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.004	0.005
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.04	- -	0.008	0.04
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0002	- -	0.00004	0.0002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.03	- -	0.007	0.04
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.006	- -	0.03	0.04
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.009	- -	0.04	0.05
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0002	- -	0.00004	0.0003
			Silver	NV	- -	NV	NV	Silver	Skin	0.0003	- -	0.001	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.03	0.2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.006	- -	0.05	0.05
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.005	- -	0.001	0.006
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.005	- -	0.0134	0.018
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0	0
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	6
	Exposure Medium Total						1.E-03						6

TABLE 9.44
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	3.E-09	- -	3.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	1.E-10	- -	1.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	3.E-14	- -	3.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	9.E-13	- -	9.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	3.E-14	- -	3.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	9.E-16	- -	9.E-16	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	6.E-14	- -	6.E-14	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	3.E-07	- -	3.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-07	- -	1.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-08	- -	4.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	2.E-10	- -	2.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	1.E-11	- -	1.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	9.E-11	- -	9.E-11	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	4.E-09	- -	4.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	4.E-10	- -	4.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	6.E-08	- -	6.E-08	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	2.E-08	- -	2.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	7.E-09	- -	7.E-09	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	9.E-09	- -	9.E-09	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	8.E-09	- -	8.E-09	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	3.E-09	- -	3.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						3.E-06						0.05
Soil Total							1.E-03						6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	9.E-08	- -	9.E-08	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	9.E-08	--	9.E-08	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						9.E-08						0.009
Groundwater Total							9.E-08						0.009

TABLE 9.44
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	8.E-08	- -	3.E-07	4.E-07	Benzo(a)pyrene	Neurological	0.0009	- -	0.003	0.004
			Arsenic	3.E-07	- -	4.E-07	7.E-07	Arsenic	Skin, Vascular	0.005	- -	0.007	0.01
			Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.02	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.01	- -	0.004	0.02
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.04	- -	0.01	0.05
			2,3,7,8-TCDD TEQ	4.E-07	- -	3.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.03	0.1
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total	--	0.09	--	0.07	0.2
	Exposure Medium Total						1.E-05						0.2
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background Constituent			0.E+00	Arsenic	Skin, Vascular	Background Constituent			0.000
			Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0005	- -	0.006	0.007
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	6.E-08	- -	4.E-07	4.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	7.E-08	- -	5.E-07	5.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	1.E-07	- -	8.E-07	9.E-07	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Chemical Total	5.E-07	--	5.E-06	5.E-06	Chemical Total	--	0.001	--	0.006	0.007
	Exposure Medium Total						5.E-06						0.007
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0002	- -	0.0006	0.0008
			Arsenic	1.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.002	- -	0.003	0.005
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	0.008	- -	0.10	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.04	- -	0.01	0.06
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Dioxin-like PCBs	1.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.01	- -	0.04	0.05
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-08	6.E-08	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.002	0.005
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	5.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.07	--	0.2	0.2
	Exposure Medium Total						5.E-05						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	5.E-09	- -	2.E-08	3.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	4.E-08	- -	2.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0004	- -	0.002	0.002
			Benzo(b)fluoranthene	4.E-09	- -	2.E-08	2.E-08	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	1.E-07	- -	4.E-07	5.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	1.E-07	- -	5.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.005	- -	0.02	0.02
			Aroclor 1260	3.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.01	- -	0.01	0.02
			Arsenic	2.E-07	- -	3.E-07	5.E-07	Arsenic	Skin, Vascular	0.004	- -	0.005	0.01
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.006	0.006
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	0.001	- -	0.01	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.001	- -	0.0003	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.01	- -	0.002	0.01
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.02	- -	0.2	0.2
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.05	- -	0.02	0.1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.01	0.01
			2,3,7,8-TCDD TEQ	4.E-08	- -	4.E-08	8.E-08	2,3,7,8-TCDD TEQ	Development	0.004	- -	0.003	0.01
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	4.E-08	- -	3.E-07	3.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	5.E-08	- -	4.E-07	4.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	1.E-06	--	9.E-06	1.E-05	Chemical Total	--	1	--	0.5	2
	Exposure Medium Total						1.E-05						2
Sediment Total							8.E-05						2

TABLE 9.44
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	0.0004	- -	0.007	0.008
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.002	- -	0.0003	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.004	0.03
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Radium-226	1.E-06	- -	2.E-11	1.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total	--	0.03	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	4.E-08	- -	7.E-07	7.E-07	Chromium (Hexavalent)	None Reported	0.00009	- -	0.001	0.001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00002	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.007	0.04
			High Risk PCBs	6.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	2.E-07	--	7.E-07	9.E-07	Chemical Total	--	0.04	--	0.01	0.04
	Exposure Medium Total						9.E-07						0.04
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Arsenic	1.E-07	- -	2.E-08	1.E-07	Arsenic	Skin, Vascular	0.002	- -	0.0004	0.002
			Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.1	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.01	0.1
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0001	- -	0.00003	0.0002
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Cyanide	Background Constituent			NV	Cyanide	Reproductive Effects	Background Constituent			0.000
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	0.8	0.8
			High Risk PCBs	6.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-09	- -	8.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.0002	- -	0.1	0.1
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.1	--	0.9	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media	1.E-03
Total Hazard Index Across All Media	10

Total Neurological HI =	0.1
Total Body and Organ Weight HI =	0.2
Total Liver HI =	0.006
Total Blood HI =	0.1
Total Skin/Vascular HI =	0.05
Total Adrenal Glands HI =	0.0000002
Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Longevity HI =	0.1
Total Kidneys HI =	0.02
Total Gastrointestinal Tract HI =	0.1
Total None Reported HI =	0.3
Total Thyroid HI =	2
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.4
Total Teeth HI =	0.0003
Total Development HI =	4
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.45
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	8.E-12	- -	1.E-12	9.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.0000001	- -	0.00000001	0.0000001
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.0003	- -	0.00004	0.0004
			1,4-Dichlorobenzene	3.E-10	- -	1.E-10	4.E-10	1,4-Dichlorobenzene	Liver	0.000003	- -	0.000001	0.000004
			Benzo(a)anthracene	6.E-09	- -	3.E-09	9.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	5.E-08	- -	3.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0006	- -	0.0003	0.0009
			Benzo(b)fluoranthene	4.E-09	- -	2.E-09	6.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	4.E-09	- -	2.E-09	6.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.00005	- -	0.00002	0.00007
			Dibenzo(a,h)anthracene	1.E-08	- -	7.E-09	2.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	3.E-09	- -	2.E-09	5.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	2.E-09	- -	9.E-10	3.E-09	Dieldrin	Liver	0.000009	- -	0.000004	0.00001
			4,4'-DDT	7.E-11	- -	9.E-12	8.E-11	4,4'-DDT	Liver	0.000001	- -	0.0000002	0.000002
			Heptachlor epoxide	5.E-09	- -	2.E-09	7.E-09	Heptachlor epoxide	Liver	0.0001	- -	0.00006	0.0002
			Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system	0.6	- -	0.4	1.0
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.007	- -	0.0003	0.007
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.01	- -	0.004	0.02
			Arsenic	7.E-07	- -	2.E-07	9.E-07	Arsenic	Skin/Vascular	0.006	- -	0.001	0.007
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.0003	- -	0.0002	0.0006
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.0002	- -	0.001	0.001
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.004	- -	0.0007	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0003	- -	0.0010	0.001
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.0003	- -	0.0006	0.0009
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.005	0.1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.03	- -	0.001	0.03
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.0001	- -	0.000005	0.0001
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.02	- -	0.0009	0.02
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.004	- -	0.004	0.008
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.006	- -	0.006	0.01
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0001	- -	0.000006	0.0002
			Silver	NV	- -	NV	NV	Silver	Skin	0.0002	- -	0.0002	0.0004
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.09	- -	0.004	0.09
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.004	- -	0.007	0.01
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.003	- -	0.0001	0.004
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.003	- -	0.0019	0.005
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development	0.3	- -	0	0
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.09	- -	0.0	0.1
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not site related			NV
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not site related			0.E+00	Cesium-137	NA	Not site related			NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not site related			NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not site related			NV
			Protactinium-234M	Not site related			0.E+00	Protactinium-234M	NA	Not site related			NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not site related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not site related			NV
			Thorium-234	Not site related			0.E+00	Thorium-234	NA	Not site related			NV
			Uranium-235	Not site related			0.E+00	Uranium-235	NA	Not site related			NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	1	- -	1	2
	Exposure Medium Total						2.E-03						2

TABLE 9.45
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.000003	- -	0.000003
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.003	- -	0.003
			1,4-Dichlorobenzene	- -	7.E-09	- -	7.E-09	1,4-Dichlorobenzene	Liver	- -	0.000003	- -	0.000003
			Benzo(a)anthracene	- -	9.E-11	- -	9.E-11	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	3.E-12	- -	3.E-12	Benzo(a)pyrene	Fetotoxicity	- -	0.000009	- -	0.000009
			Benzo(b)fluoranthene	- -	2.E-13	- -	2.E-13	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	7.E-14	- -	7.E-14	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	8.E-13	- -	8.E-13	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-13	- -	2.E-13	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	6.E-14	- -	6.E-14	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	2.E-15	- -	2.E-15	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	1.E-13	- -	1.E-13	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	6.E-07	- -	6.E-07	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-07	- -	3.E-07	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	9.E-08	- -	9.E-08	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.0001	- -	0.0001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	3.E-10	- -	3.E-10	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.00002	- -	0.00002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.00001	- -	0.00001
			Beryllium	- -	2.E-11	- -	2.E-11	Beryllium	Respiratory system, Immune system	- -	0.000002	- -	0.000002
			Cadmium	- -	2.E-10	- -	2.E-10	Cadmium	Kidneys	- -	0.00004	- -	0.00004
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.000001	- -	0.000001
			Cobalt	- -	9.E-09	- -	9.E-09	Cobalt	Respiratory System	- -	0.0006	- -	0.0006
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.000000009	- -	0.000000009
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.0002	- -	0.0002
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.0001	- -	0.0001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000000004	- -	0.000000004
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.00002	- -	0.00002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.04	- -	0.04
			Dioxin-like PCBs	- -	1.E-07	- -	1.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0003	- -	0.0003
			2,3,7,8-TCDD TEQ	- -	4.E-08	- -	4.E-08	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00009	- -	0.00009
			Bismuth-212		Not site related		0.E+00	Bismuth-212	NA		Not site related		NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not site related		0.E+00	Cesium-137	NA		Not site related		NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not site related		0.E+00	Lead-212	NA		Not site related		NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not site related		0.E+00	Potassium-40	NA		Not site related		NV
			Protactinium-234M		Not site related		0.E+00	Protactinium-234M	NA		Not site related		NV
			Radium-226	- -	6.E-09	- -	6.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not site related		0.E+00	Radium-228	NA		Not site related		NV
			Thallium-208		Not site related		NV	Thallium-208	NA		Not site related		NV
			Thorium-234		Not site related		0.E+00	Thorium-234	NA		Not site related		NV
			Uranium-235		Not site related		0.E+00	Uranium-235	NA		Not site related		NV
			Chemical Total	--	7.E-06	--	7.E-06	Chemical Total		--	0.05	--	0.05
	Exposure Medium Total						7.E-06						0.05
Soil Total							2.E-03						2

TABLE 9.45

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.002	- -	0.002
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.005	- -	0.005
			Vinyl Chloride	- -	2.E-07	- -	2.E-07	Vinyl Chloride	Liver	- -	0.002	- -	0.002
			Chemical Total	--	2.E-07	--	2.E-07	Chemical Total	--	--	0.009	--	0.009
	Exposure Medium Total						2.E-07						0.009
Groundwater Total							2.E-07						0.009
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	5.E-08	- -	1.E-07	2.E-07	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	4.E-07	- -	4.E-07	8.E-07	Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	5.E-07	- -	3.E-07	8.E-07	2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not site related			NV
			Chemical Total	1.E-06	--	4.E-06	5.E-06	Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total						5.E-06						0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background constituent			0.E+00	Arsenic	Skin, Vascular	Background constituent			0.000
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not site related			NV
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not site related			NV
			Lead-214	2.E-07	- -	1.E-06	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not site related			NV
			Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not site related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not site related			NV
			Thorium-234	Not site related			0.E+00	Thorium-234	NA	Not site related			NV
			Chemical Total	8.E-07	--	5.E-06	5.E-06	Chemical Total		0.0003	--	0.002	0.003
	Exposure Medium Total						5.E-06						0.003
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	9.E-09	- -	2.E-08	3.E-08	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	2.E-07	- -	2.E-07	3.E-07	Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Background constituent			NV	Thallium	Hair	Background constituent			0.00
			Dioxin-like PCBs	2.E-07	- -	5.E-07	6.E-07	Dioxin-like PCBs	Development	0.007	- -	0.018	0.02
			2,3,7,8-TCDD TEQ	5.E-08	- -	2.E-08	7.E-08	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not site related			NV
			Bismuth-214	1.E-07	- -	7.E-07	8.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not site related			0.E+00	Cesium-137	NA	Not site related			NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not site related			NV
			Lead-214	1.E-07	- -	9.E-07	1.E-06	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not site related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not site related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not site related			NV
			Chemical Total	3.E-06	--	2.E-05	2.E-05	Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total						2.E-05						0.1

TABLE 9.45

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	3.E-09	- -	7.E-09	1.E-08	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	2.E-08	- -	6.E-08	8.E-08	Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.001
			Benzo(b)fluoranthene	2.E-09	- -	6.E-09	8.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	6.E-08	- -	1.E-07	2.E-07	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	2.E-07	- -	4.E-07	6.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-08	- -	1.E-07	1.E-07	Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	5.E-08	- -	1.E-07	2.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	3.E-07	- -	3.E-07	6.E-07	Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	7.E-08	- -	4.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.004
			Bismuth-212	Not site related			0.E+00	Bismuth-212	NA	Not site related			NV
			Bismuth-214	9.E-08	- -	6.E-07	7.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not site related			0.E+00	Lead-212	NA	Not site related			NV
			Lead-214	1.E-07	- -	8.E-07	9.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not site related			NV
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not site related			0.E+00	Radium-228	NA	Not site related			NV
			Thallium-208	Not site related			0.E+00	Thallium-208	NA	Not site related			NV
			Chemical Total	1.E-06	--	5.E-06	6.E-06	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						6.E-06						1
Sediment Total							4.E-05						1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-07	- -	1.E-06	1.E-06	Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	4.E-06	--	1.E-05	2.E-05	Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total						2.E-05						0.4
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	3.E-08	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	9.E-11	- -	1.E-08	1.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Background constituent			0.E+00	2,3,7,8-TCDD TEQ	Development	Background constituent			0.00
			Potassium-40	Not site related			0.E+00	Potassium-40	NA	Not site related			NV
			Chemical Total	2.E-07	--	3.E-07	5.E-07	Chemical Total		0.02	--	0.00	0.03
	Exposure Medium Total						5.E-07						0.03

TABLE 9.45

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.00
			Cyanide	Background Constituent			NV	Cyanide	Reproductive Effects	Background Constituent			0.0000
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	9.E-09	- -	1.E-06	1.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-09	- -	7.E-07	7.E-07	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	7.E-06	- -	8.E-11	7.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	2.E-05	3.E-05	Chemical Total		0.06	--	0.4	0.4
	Exposure Medium Total						3.E-05						0.4
Surface Water Total							5.E-05						0.9

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 4

Total Neurological HI =	0.07
Total Body and Organ Weight HI =	0.09
Total Liver HI =	0.005
Total Blood HI =	0.03
Total Skin/Vascular HI =	0.02
Total Adrenal Glands HI =	0.0000001
Total Eyes HI =	1
Total Immune System HI =	1
Total Nails HI =	1
Total Longevity HI =	1
Total Kidneys HI =	0.008
Total Gastrointestinal Tract HI =	0.06
Total None Reported HI =	0.1
Total Thyroid HI =	1
Total Reproductive Effects HI =	0.001
Total Hair HI =	0.2
Total Teeth HI =	0.0002
Total Development HI =	1
Total Urinary Tract HI =	0.000003
Total Fetotoxicity HI =	0.00002
Total Cardiovascular System HI =	0.00002
Total Respiratory System HI =	0.001
Total Endocrine System HI =	0.0004

TABLE 9.46

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Indoor Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.02	- -	0.02
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.05	- -	0.05
			Vinyl Chloride	- -	2.E-06	- -	2.E-06	Vinyl Chloride	Liver	- -	0.01	- -	0.01
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total	--	--	0.08	--	0.08
	Exposure Medium Total						2.E-06						0.08
Groundwater Total							2.E-06						0.08

Total Risk Across All Media: 2.E-06

Total Hazard Index Across All Media: 0.08

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	1,2,4-Trichlorobenzene	5.E-13	- -	4.E-14	5.E-13	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.0000001	0.000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.005	- -	0.0005	0.005
			1,4-Dichlorobenzene	2.E-11	- -	5.E-12	2.E-11	1,4-Dichlorobenzene	Liver	0.00004	- -	0.00001	0.00005
			Benzo(a)anthracene	3.E-10	- -	1.E-10	4.E-10	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	3.E-09	- -	1.E-09	4.E-09	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	2.E-10	- -	8.E-11	3.E-10	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	2.E-10	- -	7.E-11	3.E-10	Bis(2-ethylhexyl)phthalate	Liver	0.0007	- -	0.0002	0.0010
			Dibenzo(a,h)anthracene	7.E-10	- -	3.E-10	1.E-09	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	2.E-10	- -	7.E-11	2.E-10	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-10	- -	4.E-11	2.E-10	Dieldrin	Liver	0.0001	- -	0.00004	0.0002
			4,4'-DDT	4.E-12	- -	4.E-13	4.E-12	4,4'-DDT	Liver	0.00002	- -	0.000002	0.00002
			Heptachlor epoxide	3.E-10	- -	9.E-11	4.E-10	Heptachlor epoxide	Liver	0.002	- -	0.0007	0.003
			Aroclor 1248	6.E-07	- -	3.E-07	8.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	4.E-07	- -	2.E-07	5.E-07	Aroclor 1254	Eyes, nails, immune system	9	- -	4	12
			Aroclor 1260	2.E-07	- -	8.E-08	3.E-07	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	5.E-06	- -	2.E-06	7.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.10	- -	0.003	0.1
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.2	- -	0.04	0.2
			Arsenic	4.E-08	- -	6.E-09	5.E-08	Arsenic	Skin/Vascular	0.08	- -	0.01	0.09
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.002	0.007
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.003	- -	0.01	0.01
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.06	- -	0.007	0.07
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.01	0.01
			Chromium (Hexavalent)	8.E-09	- -	1.E-08	2.E-08	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.01	0.4
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.002	- -	0.00006	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.3	- -	0.01	0.3
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.06	- -	0.05	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.08	- -	0.07	0.2
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00007	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.003	- -	0.002	0.005
			Thallium	NV	- -	NV	NV	Thallium	Hair	1	- -	0.04	1
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.06	- -	0.07	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.05	- -	0.002	0.05
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.04	- -	0.021	0.07
			Dioxin-like PCBs	4.E-07	- -	2.E-07	6.E-07	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	1.E-07	- -	1.E-08	1.E-07	2,3,7,8-TCDD TEQ	Development	1	- -	0	1
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-06	- -	2.E-05	2.E-05	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-210	3.E-06	- -	2.E-08	3.E-06	Lead-210	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-06	- -	3.E-05	3.E-05	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	Not Site Related			0.E+00	Protactinium-234M	NA	Not Site Related			NV
			Radium-226	5.E-07	- -	5.E-06	6.E-06	Radium-226	NA	NV	- -	NV	NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Thorium-234	Not Site Related			0.E+00	Thorium-234	NA	Not Site Related			NV
			Uranium-235	Not Site Related			0.E+00	Uranium-235	NA	Not Site Related			NV
			Chemical Total	1.E-05	- -	6.E-05	7.E-05	Chemical Total	- -	18	- -	6	24
	Exposure Medium Total						7.E-05						24

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.00002	- -	0.00002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.02	- -	0.02
			1,4-Dichlorobenzene	- -	2.E-10	- -	2.E-10	1,4-Dichlorobenzene	Liver	- -	0.00002	- -	0.00002
			Benzo(a)anthracene	- -	3.E-12	- -	3.E-12	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	1.E-13	- -	1.E-13	Benzo(a)pyrene	Fetotoxicity	- -	0.00007	- -	0.00007
			Benzo(b)fluoranthene	- -	7.E-15	- -	7.E-15	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	2.E-15	- -	2.E-15	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	3.E-14	- -	3.E-14	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	6.E-15	- -	6.E-15	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	2.E-15	- -	2.E-15	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	7.E-17	- -	7.E-17	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	5.E-15	- -	5.E-15	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-08	- -	2.E-08	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-08	- -	1.E-08	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	3.E-09	- -	3.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-07	- -	2.E-07	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.001	- -	0.001
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	1.E-11	- -	1.E-11	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0002	- -	0.0002
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.0001	- -	0.0001
			Beryllium	- -	8.E-13	- -	8.E-13	Beryllium	Respiratory system, Immune system	- -	0.00002	- -	0.00002
			Cadmium	- -	7.E-12	- -	7.E-12	Cadmium	Kidneys	- -	0.0003	- -	0.0003
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	8.E-11	- -	8.E-11	Chromium (Hexavalent)	Respiratory System	- -	0.000009	- -	0.000009
			Cobalt	- -	3.E-10	- -	3.E-10	Cobalt	Respiratory System	- -	0.005	- -	0.005
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00000008	- -	0.00000008
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.002	- -	0.002
			Nickel	- -	3.E-11	- -	3.E-11	Nickel	Respiratory System	- -	0.001	- -	0.001
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.00000003	- -	0.00000003
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.0002	- -	0.0002
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.4	- -	0.4
			Dioxin-like PCBs	- -	5.E-09	- -	5.E-09	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	- -	1.E-09	- -	1.E-09	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0008	- -	0.0008
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	2.E-08	- -	2.E-08	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-210	- -	2.E-08	- -	2.E-08	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	2.E-08	- -	2.E-08	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not Site Related		NV
			Radium-226	- -	7.E-09	- -	7.E-09	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	3.E-07	--	3.E-07	Chemical Total		--	0.4	--	0.4
	Exposure Medium Total						3.E-07						0.4
Soil Total							7.E-05						25

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV		NV	Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22
Groundwater	Groundwater	Utility Trench	Aluminum	- -	- -	NV	NV	Aluminum	Neurological	- -	- -	0.0001	0.0001
			Antimony	- -	- -	NV	NV	Antimony	Blood, Longevity	- -	- -	0.04	0.04
			Arsenic	- -	- -	3.E-09	3.E-09	Arsenic	Skin, Vascular	- -	- -	0.01	0.01
			Barium	- -	- -	NV	NV	Barium	Kidneys	- -	- -	0.003	0.003
			Cadmium	- -	- -	NV	NV	Cadmium	Kidneys	- -	- -	0.004	0.004
			Chromium (Trivalent)	- -	- -	NV	NV	Chromium (Trivalent)	None Reported	- -	- -	0.00003	0.00003
			Chromium (Hexavalent)	- -	- -	7.E-08	7.E-08	Chromium (Hexavalent)	None Reported	- -	- -	0.04	0.04
			Cobalt	- -	- -	NV	NV	Cobalt	Thyroid	- -	- -	0.01	0.01
			Iron	- -	- -	NV	NV	Iron	Gastrointestinal Tract	- -	- -	0.003	0.003
			Manganese	- -	- -	NV	NV	Manganese	Neurological	- -	- -	0.05	0.05
			Mercury	- -	- -	NV	NV	Mercury	Development, Neurological	- -	- -	0.0002	0.0002
			Nickel	- -	- -	NV	NV	Nickel	Body and Organ Weights	- -	- -	0.003	0.003
			Selenium	- -	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	- -	- -	0.0002	0.0002
			Thallium	- -	- -	NV	NV	Thallium	Hair	- -	- -	0.1	0.1
			Vanadium	- -	- -	NV	NV	Vanadium	Hair	- -	- -	0.003	0.003
			Naphthalene	- -	- -	NV	NV	Naphthalene	Blood and immune system	- -	- -	0.0004	0.0004
			Chlorobenzene	- -	- -	NV	NV	Chlorobenzene	Liver	- -	- -	0.008	0.008
			cis-1,2-Dichloroethene	- -	- -	NV	NV	cis-1,2-Dichloroethene	Kidneys	- -	- -	0.005	0.005
			Vinyl chloride	- -	- -	3.E-09	3.E-09	Vinyl chloride	Liver	- -	- -	0.001	0.001
			1,4-Dichlorobenzene	- -	- -	9.E-11	9.E-11	1,4-Dichlorobenzene	Liver	- -	- -	0.0002	0.0002
			Cyanide	- -	- -	NV	NV	Cyanide	Reproductive Effects	- -	- -	0.003	0.003
			Dioxin-Like PCBs	- -	- -	8.E-09	8.E-09	Dioxin-Like PCBs	Development	- -	- -	0.08	0.08
			High Risk PCBs	- -	- -	1.E-08	1.E-08	High Risk PCBs	NA	- -	- -	NV	NV
			2,3,7,8-TCDD TEQ	- -	- -	1.E-07	1.E-07	2,3,7,8-TCDD TEQ	Development	- -	- -	1	1
			Bismuth-214	- -	- -	1.E-13	1.E-13	Bismuth-214	NA	- -	- -	NV	NV
			Lead-210	- -	- -	4.E-16	4.E-16	Lead-210	NA	- -	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	- -	- -	9.E-14	9.E-14	Lead-214	NA	- -	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-226	- -	- -	1.E-12	1.E-12	Radium-226	NA	- -	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Strontium-90	- -	- -	4.E-17	4.E-17	Strontium-90	NA	- -	- -	NV	NV
			Chemical Total	--	--	2.E-07	2.E-07	Chemical Total		--	--	2	2
	Exposure Medium Total						2.E-07						2
Groundwater Total							2.E-07						23
Sediment	Northern Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	3.E-09	- -	1.E-09	4.E-09	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Arsenic	2.E-08	- -	3.E-09	3.E-08	Arsenic	Skin, Vascular	0.04	- -	0.007	0.05
			Chromium (Hexavalent)	2.E-08	- -	3.E-08	5.E-08	Chromium (Hexavalent)	None Reported	0.01	- -	0.02	0.03
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.1	- -	0.004	0.1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-09	3.E-08	2,3,7,8-TCDD TEQ	Development	0.3	- -	0.03	0.3
			Radium-226		Not site related		0.E+00	Radium-226	NA		Not site related		NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Chemical Total	8.E-08	--	4.E-08	1.E-07	Chemical Total		0.9	--	0.07	1
	Exposure Medium Total						1.E-07						1
	Northern Drainage Channel Sediment	Volatile and Fugitive Dust Emissions	Chromium (Hexavalent)	- -	3.E-09	- -	3.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0003	- -	0.0003
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.1	- -	0.1
			2,3,7,8-TCDD TEQ	- -	1.E-09	- -	1.E-09	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.001	- -	0.001
			Chemical Total	--	4.E-09	--	4.E-09	Chemical Total		--	0.1	--	0.1
	Exposure Medium Total						4.E-09						0.1

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	1.E-08	- -	2.E-09	2.E-08	Arsenic	Skin, Vascular	0.03	- -	0.004	0.03
			Chromium (Hexavalent)	8.E-09	- -	1.E-08	2.E-08	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	3.E-09	- -	3.E-08	3.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	3.E-09	- -	3.E-08	4.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-226	7.E-09	- -	6.E-08	6.E-08	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Chemical Total	3.E-08	--	1.E-07	2.E-07	Chemical Total		0.03	--	0.01	0.04
	Exposure Medium Total						2.E-07						0.04
	Freshwater Wetland Sediment	Volatile and Fugitive Dust Emissions	Arsenic	- -	5.E-11	- -	5.E-11	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.001	- -	0.001
			Chromium (Hexavalent)	- -	1.E-09	- -	1.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.002	- -	0.002
			Bismith-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	- -	6.E-12	- -	6.E-12	Bismuth-214	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-210	NA	- -	NV	- -	NV
			Lead-214	- -	7.E-12	- -	7.E-12	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-226	- -	2.E-11	- -	2.E-11	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		NV	Thallium-208	NA		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not Site Related		NV
			Chemical Total	--	1.E-09	--	1.E-09	Chemical Total		--	0.003	--	0.003
	Exposure Medium Total						1.E-09						0.003
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	5.E-10	- -	2.E-10	7.E-10	Benzo(a)pyrene	Neurological	0.002	- -	0.0006	0.002
			Arsenic	1.E-08	- -	2.E-09	1.E-08	Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	1.E-07	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.08	- -	0.1	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.4	- -	0.01	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.1	- -	0.004	0.1
			Dioxin-like PCBs	1.E-08	- -	5.E-09	1.E-08	Dioxin-like PCBs	Development	0.1	- -	0.05	0.1
			2,3,7,8-TCDD TEQ	3.E-09	- -	2.E-10	3.E-09	2,3,7,8-TCDD TEQ	Development	0.03	- -	0.002	0.03
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	2.E-09	- -	2.E-08	2.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not Site Related		NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	3.E-09	- -	3.E-08	3.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Chemical Total	2.E-07	--	2.E-07	4.E-07	Chemical Total		0.8	--	0.2	1
	Exposure Medium Total						4.E-07						1
Sediment	Paradise Creek Sediment	Volatile and Fugitive Dust Emissions	Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Cobalt		9.E-10		9.E-10	Cobalt	Respiratory System	- -	0.02	- -	0.02
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.1	- -	0.07
			Chemical Total	--	9.E-10	--	9.E-10	Chemical Total		--	0.1	--	0.1
	Exposure Medium Total						9.E-10						0.1

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	2.E-10	- -	7.E-11	2.E-10	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-09	- -	6.E-10	2.E-09	Benzo(a)pyrene	Neurological	0.004	- -	0.002	0.006
			Benzo(b)fluoranthene	1.E-10	- -	6.E-11	2.E-10	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	3.E-09	- -	1.E-09	5.E-09	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	9.E-09	- -	4.E-09	1.E-08	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-09	- -	9.E-10	3.E-09	Aroclor 1254	Eyes, Nails, Immune System	0.05	- -	0.02	0.07
			Aroclor 1260	3.E-09	- -	1.E-09	4.E-09	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.07	- -	0.02	0.09
			Arsenic	2.E-08	- -	3.E-09	2.E-08	Arsenic	Skin, Vascular	0.03	- -	0.005	0.04
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	2.E-08	- -	2.E-08	4.E-08	Chromium (Hexavalent)	None Reported	0.01	- -	0.01	0.02
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	11	- -	0.3	11
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.01	- -	0.0004	0.01
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.05	- -	0.002	0.05
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.2	- -	0.2	0.4
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.5	- -	0.02	0.5
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.02	- -	0.0103	0.03
			2,3,7,8-TCDD TEQ	4.E-09	- -	3.E-10	4.E-09	2,3,7,8-TCDD TEQ	Development	0.04	- -	0.003	0.04
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	2.E-09	- -	2.E-08	2.E-08	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not Site Related		NV
			Lead-214	2.E-09	- -	3.E-08	3.E-08	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not Site Related		NV
			Radium-226		Not site related		0.E+00	Radium-226	NA		Not site related		NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not Site Related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not Site Related		NV
			Chemical Total	6.E-08	--	8.E-08	1.E-07	Chemical Total		12	--	0.6	12
	Exposure Medium Total						1.E-07						12
Sediment	Estuarine Wetland Sediment	Volatile and Fugitive Dust Emissions	Aroclor 1248	- -	9.E-10	- -	9.E-10	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-10	- -	1.E-10	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	1.E-10	- -	1.E-10	Aroclor 1260	NA	- -	NV	- -	NV
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-09	- -	2.E-09	Chromium (Hexavalent)	Respiratory System	- -	0.0002	- -	0.0002
			Cobalt	- -	2.E-08	- -	2.E-08	Cobalt	Respiratory System	- -	0.4	- -	0.4
			Nickel	- -	8.E-10	- -	8.E-10	Nickel	Respiratory System	- -	0.03	- -	0.03
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	1	- -	1
			Chemical Total	--	3.E-08	--	3.E-08	Chemical Total		--	1	--	1
	Exposure Medium Total						3.E-08						1
Sediment Total							8.E-07						16
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	6.E-10	- -	4.E-10	1.E-09	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	4.E-10	- -	2.E-08	3.E-08	Chromium (Hexavalent)	None Reported	0.0003	- -	0.01	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.0010	- -	0.0007	0.002
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.009	0.02
			2,3,7,8-TCDD TEQ	1.E-10	- -	1.E-07	1.E-07	2,3,7,8-TCDD TEQ	Development	0.001	- -	1	1
			Radium-226	8.E-10	- -	1.E-13	8.E-10	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-09	--	2.E-07	2.E-07	Chemical Total		0.02	--	2	2
	Exposure Medium Total						2.E-07						2

TABLE 9.47
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	6.E-10	- -	4.E-10	9.E-10	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	8.E-11	- -	5.E-09	5.E-09	Chromium (Hexavalent)	None Reported	0.00005	- -	0.003	0.003
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00006	- -	0.00005	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.02	- -	0.01	0.03
			High Risk PCBs	3.E-13	- -	2.E-10	2.E-10	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	7.E-12	- -	7.E-09	7.E-09	2,3,7,8-TCDD TEQ	Development	0.00007	- -	0.07	0.07
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Chemical Total	6.E-10	--	1.E-08	1.E-08	Chemical Total		0.02	--	0.09	0.1
	Exposure Medium Total						1.E-08						0.1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	6.E-10	- -	4.E-10	1.E-09	Arsenic	Skin, Vascular	0.001	- -	0.0008	0.002
			Chromium (Hexavalent)	4.E-09	- -	2.E-07	3.E-07	Chromium (Hexavalent)	None Reported	0.003	- -	0.2	0.2
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.05	- -	0.01	0.07
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.00008	- -	0.00006	0.0001
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.01	- -	0.010	0.02
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive Effects	0.0004	- -	0.0002	0.0006
			Dioxin-Like PCBs	4.E-11	- -	1.E-07	1.E-07	Dioxin-Like PCBs	Development	0.0004	- -	1	1
			High Risk PCBs	3.E-11	- -	2.E-08	2.E-08	High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-11	- -	1.E-08	1.E-08	2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.1	0.1
			Radium-226	2.E-09	- -	2.E-13	2.E-09	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	7.E-09	--	4.E-07	4.E-07	Chemical Total		0.1	--	1	1
	Exposure Medium Total						4.E-07						1
Surface Water Total							6.E-07						3

Total Risk Across All Media: 7.E-05

Total Hazard Index Across All Media: 67

Total Neurological HI =	2
Total Body and Organ Weight HI =	0.5
Total Liver HI =	0.05
Total Blood HI =	0.4
Total Skin/Vascular HI =	0.3
Total Adrenal Glands HI =	0.000002
Total Eyes HI =	12
Total Immune System HI =	13
Total Nails HI =	12
Total Longevity HI =	0.4
Total Kidneys HI =	0.1
Total Gastrointestinal Tract HI =	0.8
Total None Reported HI =	0.5
Total Thyroid HI =	35
Total Reproductive Effects HI =	0.01
Total Hair HI =	3
Total Teeth HI =	0.002
Total Development HI =	12
Total Urinary Tract HI =	0.00002
Total Fetotoxicity HI =	0.0002
Total Cardiovascular System HI =	0.0008
Total Respiratory System HI =	0.4
Total Endocrine System HI =	0.004

TABLE 9.48
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			1,2,4-Trichlorobenzene	6.E-12	- -	5.E-13	6.E-12	1,2,4-Trichlorobenzene	Adrenal glands	0.000001	- -	0.0000001	0.000002
			Chlorobenzene	NV	- -	NV	NV	Chlorobenzene	Liver	0.005	- -	0.0005	0.005
			1,4-Dichlorobenzene	2.E-10	- -	7.E-11	3.E-10	1,4-Dichlorobenzene	Liver	0.00004	- -	0.00001	0.00005
			Benzo(a)anthracene	4.E-09	- -	2.E-09	5.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	3.E-08	- -	1.E-08	5.E-08	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	3.E-09	- -	1.E-09	4.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	3.E-09	- -	9.E-10	4.E-09	Bis(2-ethylhexyl)phthalate	Liver	0.0007	- -	0.0002	0.0009
			Dibenzo(a,h)anthracene	9.E-09	- -	4.E-09	1.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	2.E-09	- -	9.E-10	3.E-09	Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	1.E-09	- -	5.E-10	2.E-09	Dieldrin	Liver	0.0001	- -	0.00004	0.0002
			4,4'-DDT	5.E-11	- -	5.E-12	5.E-11	4,4'-DDT	Liver	0.00002	- -	0.000002	0.00002
			Heptachlor epoxide	3.E-09	- -	1.E-09	4.E-09	Heptachlor epoxide	Liver	0.002	- -	0.0006	0.003
			Aroclor 1248	7.E-06	- -	3.E-06	1.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	2.E-06	7.E-06	Aroclor 1254	Eyes, nails, immune system	8	- -	4	12
			Aroclor 1260	2.E-06	- -	1.E-06	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05		3.E-05	9.E-05	High Risk PCB Congeners	NA	NV		NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.09	- -	0.03	0.1
			Antimony	NV	- -	NV	NV	Antimony	Blood and longevity	0.2	- -	0.04	0.2
			Arsenic	5.E-07	- -	3.E-08	5.E-07	Arsenic	Skin/Vascular	0.08	- -	0.004	0.08
			Barium	NV	- -	NV	NV	Barium	Kidneys	0.005	- -	0.007	0.01
			Beryllium	NV	- -	NV	NV	Beryllium	Gastrointestinal Tract	0.003	- -	0.01	0.01
			Cadmium	NV	- -	NV	NV	Cadmium	Kidneys	0.06	- -	0.07	0.13
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.004	- -	0.001	0.005
			Chromium (Hexavalent)	1.E-07	- -	1.E-07	2.E-07	Chromium (Hexavalent)	None Reported	0.005	- -	0.006	0.01
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.3	- -	0.01	0.4
			Cyanide	NV	- -	NV	NV	Cyanide	Reproductive effects	0.002	- -	0.00006	0.002
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.3	- -	0.010	0.3
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.05	- -	0.04	0.10
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ weights	0.08	- -	0.06	0.1
			Selenium	NV	- -	NV	NV	Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.002	- -	0.00007	0.002
			Silver	NV	- -	NV	NV	Silver	Skin	0.002	- -	0.002	0.004
			Thallium	NV	- -	NV	NV	Thallium	Hair	1	- -	0.04	1
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.06	- -	0.07	0.1
			Zinc	NV	- -	NV	NV	Zinc	Blood and immune system	0.05	- -	0.002	0.05
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune effects	0.04	- -	0.020	0.06
			Dioxin-like PCBs	5.E-06	- -	2.E-06	7.E-06	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	2.E-06	- -	1.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	1	- -	0.1	1
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not site related		NV
			Bismuth-214	3.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not site related		NV
			Lead-210	4.E-05	- -	2.E-07	4.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not site related		NV
			Lead-214	3.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not site related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not site related		NV
			Radium-226	7.E-06	- -	7.E-05	7.E-05	Radium-226	NA	NV	- -	NV	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not site related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not site related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not site related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not site related		NV
			Chemical Total	2.E-04	- -	7.E-04	9.E-04	Chemical Total	- -	17	- -	6	23
	Exposure Medium Total						9.E-04						23

TABLE 9.48
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Fugitive Dust Emissions											
			1,2,4-Trichlorobenzene	- -	NV	- -	NV	1,2,4-Trichlorobenzene	Urinary tract	- -	0.0002	- -	0.0002
			Chlorobenzene	- -	NV	- -	NV	Chlorobenzene	Liver, kidneys	- -	0.2	- -	0.2
			1,4-Dichlorobenzene	- -	3.E-08	- -	3.E-08	1,4-Dichlorobenzene	Liver	- -	0.0002	- -	0.0002
			Benzo(a)anthracene	- -	4.E-10	- -	4.E-10	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	- -	4.E-10	- -	4.E-10	Benzo(a)pyrene	Fetotoxicity	- -	0.02	- -	0.02
			Benzo(b)fluoranthene	- -	3.E-11	- -	3.E-11	Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	- -	9.E-12	- -	9.E-12	Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	- -	1.E-10	- -	1.E-10	Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	- -	2.E-11	- -	2.E-11	Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	- -	8.E-12	- -	8.E-12	Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	- -	3.E-13	- -	3.E-13	4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	- -	2.E-11	- -	2.E-11	Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	- -	2.E-06	- -	2.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-06	- -	1.E-06	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	4.E-07	- -	4.E-07	Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-05	- -	2.E-05	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.3	- -	0.3
			Antimony	- -	NV	- -	NV	Antimony	NA	- -	NV	- -	NV
			Arsenic	- -	4.E-08	- -	4.E-08	Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.05	- -	0.05
			Barium	- -	NV	- -	NV	Barium	Fetotoxicity	- -	0.03	- -	0.03
			Beryllium	- -	3.E-09	- -	3.E-09	Beryllium	Respiratory system, Immune system	- -	0.005	- -	0.005
			Cadmium	- -	3.E-08	- -	3.E-08	Cadmium	Kidneys	- -	0.1	- -	0.1
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-07	- -	3.E-07	Chromium (Hexavalent)	Respiratory System	- -	0.003	- -	0.003
			Cobalt	- -	1.E-06	- -	1.E-06	Cobalt	Respiratory System	- -	1	- -	1
			Copper	- -	NV	- -	NV	Copper	NA	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV	Cyanide	Thyroid	- -	0.00002	- -	0.00002
			Iron	- -	NV	- -	NV	Iron	NA	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.5	- -	0.5
			Nickel	- -	1.E-07	- -	1.E-07	Nickel	Respiratory System	- -	0.3	- -	0.3
			Selenium	- -	NV	- -	NV	Selenium	Liver, cardiovascular system, neurological	- -	0.000009	- -	0.000009
			Silver	- -	NV	- -	NV	Silver	NA	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV	Thallium	NA	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV	Vanadium	Respiratory System	- -	0.05	- -	0.05
			Zinc	- -	NV	- -	NV	Zinc	NA	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	6	- -	6
			Dioxin-like PCBs	- -	6.E-07	- -	6.E-07	Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	NV	- -	NV
			2,3,7,8-TCDD TEQ	- -	2.E-07	- -	2.E-07	2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	NV	- -	NV
			Bismuth-212		Not Site Related		0.E+00	Bismuth-212	NA		Not site related		NV
			Bismuth-214	- -	6.E-06	- -	6.E-06	Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137		Not Site Related		0.E+00	Cesium-137	NA		Not site related		NV
			Lead-210	- -	8.E-06	- -	8.E-06	Lead-210	NA	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00	Lead-212	NA		Not site related		NV
			Lead-214	- -	7.E-06	- -	7.E-06	Lead-214	NA	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00	Potassium-40	NA		Not site related		NV
			Protactinium-234M		Not Site Related		0.E+00	Protactinium-234M	NA		Not site related		NV
			Radium-226	- -	2.E-06	- -	2.E-06	Radium-226	NA	- -	NV	- -	NV
			Radium-228		Not Site Related		0.E+00	Radium-228	NA		Not site related		NV
			Thallium-208		Not Site Related		0.E+00	Thallium-208	NA		Not site related		NV
			Thorium-234		Not Site Related		0.E+00	Thorium-234	NA		Not site related		NV
			Uranium-235		Not Site Related		0.E+00	Uranium-235	NA		Not site related		NV
			Chemical Total	--	5.E-05	--	5.E-05	Chemical Total	--	--	9	--	9
	Exposure Medium Total						5.E-05						9
Soil Total							1.E-03						33

TABLE 9.48
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV		NV	Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22
Groundwater Total							0.E+00						22

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 54

Total Neurological HI =	7
Total Body and Organ Weight HI =	0.1
Total Liver HI =	0.2
Total Blood HI =	0.3
Total Skin/Vascular HI =	0.1
Total Adrenal Glands HI =	0.000002
Total Eyes HI =	12
Total Immune System HI =	12
Total Nails HI =	12
Total Longevity HI =	0.2
Total Kidneys HI =	0.4
Total Gastrointestinal Tract HI =	0.7
Total None Reported HI =	0.02
Total Thyroid HI =	23
Total Reproductive Effects HI =	0.002
Total Hair HI =	1
Total Teeth HI =	0.002
Total Development HI =	7
Total Urinary Tract HI =	0.0002
Total Fetotoxicity HI =	0.06
Total Cardiovascular System HI =	0.05
Total Respiratory System HI =	2

TABLE 9.49

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future

Receptor Population: Construction Worker (90-Day Dock Construction Project)

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	4.E-09	- -	2.E-09	6.E-09	Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.004
			Arsenic	9.E-08	- -	1.E-08	1.E-07	Arsenic	Skin, Vascular	0.04	- -	0.006	0.05
			Chromium (Hexavalent)	1.E-06	- -	1.E-06	3.E-06	Chromium (Hexavalent)	None Reported	0.2	- -	0.2	0.4
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.8	- -	0.03	0.9
			Thallium	Background Constituent			NV	Thallium	Hair	Background Constituent			0.0
			Dioxin-like PCBs	9.E-08	- -	4.E-08	1.E-07	Dioxin-like PCBs	Development	0.2	- -	0.09	0.3
			2,3,7,8-TCDD TEQ	2.E-08	- -	2.E-09	2.E-08	2,3,7,8-TCDD TEQ	Development	0.05	- -	0.005	0.06
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	Not Site Related			0.E+00	Cesium-137	NA	Not Site Related			NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-08	- -	3.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	1.E-06	- -	2.E-06	3.E-06	Chemical Total	- -	1	- -	0.3	2
	Exposure Medium Total						3.E-06						2
Sediment	Paradise Creek Sediment	Volatile and Fugitive Dust Emissions	Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Cobalt	- -	8.E-09	- -	8.E-09	Cobalt	Respiratory System	- -	0.04	- -	0.04
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	- -	8.E-09	- -	8.E-09	Chemical Total	- -	- -	0.2	- -	0.2
	Exposure Medium Total						8.E-09						0.2

TABLE 9.49

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future

Receptor Population: Construction Worker (90-Day Dock Construction Project)

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland											
			Benzo(a)anthracene	2.E-09	- -	7.E-10	2.E-09	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	1.E-08	- -	5.E-09	2.E-08	Benzo(a)pyrene	Neurological	0.008	- -	0.003	0.01
			Benzo(b)fluoranthene	1.E-09	- -	5.E-10	2.E-09	Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	3.E-08	- -	1.E-08	4.E-08	Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	8.E-08	- -	4.E-08	1.E-07	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-08	- -	8.E-09	3.E-08	Aroclor 1254	Eyes, Nails, Immune System	0.09	- -	0.04	0.1
			Aroclor 1260	2.E-08	- -	1.E-08	3.E-08	Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV	Antimony	Blood, Longevity	0.1	- -	0.03	0.2
			Arsenic	2.E-07	- -	2.E-08	2.E-07	Arsenic	Skin, Vascular	0.07	- -	0.01	0.08
			Chromium (Total)	NV	- -	NV	NV	Chromium (Total)	None Reported	0.005	- -	0.01	0.02
			Chromium (Hexavalent)	2.E-07	- -	2.E-07	4.E-07	Chromium (Hexavalent)	None Reported	0.02	- -	0.03	0.05
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	21	- -	0.7	22
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.02	- -	0.0007	0.02
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.1	- -	0.003	0.1
			Nickel	NV	- -	NV	NV	Nickel	Body and Organ Weights	0.4	- -	0.3	0.7
			Thallium	NV	- -	NV	NV	Thallium	Hair	1.0	- -	0.03	1
			Mercury	NV	- -	NV	NV	Mercury	Autoimmune Effects	0.04	- -	0.001	0.05
			2,3,7,8-TCDD TEQ	3.E-08	- -	3.E-09	4.E-08	2,3,7,8-TCDD TEQ	Development	0.07	- -	0.007	0.08
			Bismuth-212	Not Site Related			0.E+00	Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	2.E-08	- -	2.E-07	2.E-07	Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	Not Site Related			0.E+00	Lead-212	NA	Not Site Related			NV
			Lead-214	2.E-08	- -	2.E-07	3.E-07	Lead-214	NA	NV	- -	NV	NV
			Potassium-40	Not Site Related			0.E+00	Potassium-40	NA	Not Site Related			NV
			Radium-226	Not site related			0.E+00	Radium-226	NA	Not site related			NV
			Radium-228	Not Site Related			0.E+00	Radium-228	NA	Not Site Related			NV
			Thallium-208	Not Site Related			0.E+00	Thallium-208	NA	Not Site Related			NV
			Chemical Total	6.E-07	- -	7.E-07	1.E-06	Chemical Total	- -	23	- -	1	24
	Exposure Medium Total						1.E-06						24

TABLE 9.49

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future

Receptor Population: Construction Worker (90-Day Dock Construction Project)

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Air	Volatile and Fugitive Dust Emissions	Aroclor 1248	- -	8.E-09	- -	8.E-09	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	1.E-09	- -	1.E-09	Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	- -	1.E-09	- -	1.E-09	Aroclor 1260	NA	- -	NV	- -	NV
			Chromium (Total)	- -	NV	- -	NV	Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	2.E-08	- -	2.E-08	Chromium (Hexavalent)	Respiratory System	- -	0.001	- -	0.001
			Cobalt	- -	2.E-07	- -	2.E-07	Cobalt	Respiratory System	- -	1	- -	1
			Nickel	- -	7.E-09	- -	7.E-09	Nickel	Respiratory System	- -	0.1	- -	0.1
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	3	- -	3
			Chemical Total	- -	2.E-07	- -	2.E-07	Chemical Total	- -	- -	4	- -	4
	Exposure Medium Total						2.E-07						4
Sediment Total							5.E-06						30

Total Risk Across All Media: 5.E-06

Total Hazard Index Across All Media: 30

Total Neurological HI =	3
Total Body and Organ Weight HI =	0.7
Total Blood HI =	0.2
Total Skin/Vascular HI =	0.1
Total Eyes HI =	0.1
Total Immune System HI =	0.2
Total Nails HI =	0.1
Total Longevity HI =	0.2
Total Gastrointestinal Tract HI =	0.1
Total None Reported HI =	0.4
Total Thyroid HI =	23
Total Hair HI =	1
Total Development HI =	0.4
Total Respiratory System HI =	1

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil						
			1,2,4-Trichlorobenzene	Adrenal glands	0.00001	- -	0.0000004	0.000007
			Chlorobenzene	Liver	0.02	- -	0.002	0.02
			1,4-Dichlorobenzene	Liver	0.0002	- -	0.00004	0.0002
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.04	- -	0.01	0.05
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.003	- -	0.0007	0.004
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	Liver	0.0006	- -	0.0001	0.0007
			4,4'-DDT	Liver	0.00009	- -	0.000006	0.00010
			Heptachlor epoxide	Liver	0.009	- -	0.002	0.01
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	37	- -	12	49
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.4	- -	0.010	0.4
			Antimony	Blood and longevity	0.9	- -	0.1	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Barium	Kidneys	0.02	- -	0.007	0.03
			Beryllium	Gastrointestinal Tract	0.01	- -	0.04	0.05
			Cadmium	Kidneys	0.3	- -	0.02	0.3
			Chromium (Total)	None Reported	0.02	- -	0.03	0.05
			Chromium (Hexavalent)	None Reported	0.02	- -	0.02	0.04
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.04	2
			Cyanide	Reproductive effects	0.008	- -	0.0002	0.008
			Iron	Gastrointestinal Tract	1	- -	0.03	1
			Manganese	Neurological	0.2	- -	0.1	0.4
			Nickel	Body and Organ weights	0.4	- -	0.2	0.6
			Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.009	- -	0.0002	0.009
			Silver	Skin	0.01	- -	0.007	0.02
			Thallium	Hair	5	- -	0.1	5
			Vanadium	Hair	0.3	- -	0.2	0.5
			Zinc	Blood and immune system	0.2	- -	0.005	0.2
			Mercury	Autoimmune effects	0.2	- -	0.066	0.3
			Dioxin-like PCBs	Development	18	- -	6	24
			2,3,7,8-TCDD TEQ	Development	5	- -	0	6
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total	- -	79	- -	20	99
	Exposure Medium Total							99

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions						
			1,2,4-Trichlorobenzene	Urinary tract	- -	0.00010	- -	0.00010
			Chlorobenzene	Liver, kidneys	- -	0.09	- -	0.09
			1,4-Dichlorobenzene	Liver	- -	0.00010	- -	0.00010
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0003	- -	0.0003
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.005	- -	0.005
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0005	- -	0.0005
			Beryllium	Respiratory system, Immune system	- -	0.00006	- -	0.00006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.00003	- -	0.00003
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Cyanide	Thyroid	- -	0.0000003	- -	0.0000003
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.007	- -	0.007
			Nickel	Respiratory System	- -	0.004	- -	0.004
			Selenium	Liver, cardiovascular system, neurological	- -	0.0000001	- -	0.0000001
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0007	- -	0.0007
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	2	- -	2
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.01	- -	0.01
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total	--	--	2	--	2
	Exposure Medium Total							2
Soil Total								101

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.04	- -	0.0002	0.04
			Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Barium	Kidneys	0.08	- -	0.005	0.09
			Cadmium	Kidneys	0.07	- -	0.007	0.08
			Chromium (Trivalent)	None Reported	0.0001	- -	0.00005	0.0002
			Chromium (Hexavalent)	None Reported	0.2	- -	0.07	0.3
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Mercury	Autoimmune Effects	0.08	- -	0.0004	0.09
			Nickel	Body and Organ Weights	0.05	- -	0.001	0.05
			Selenium	Nails, Blood, Teeth, Skin, Central Nervous S	0.08	- -	0.0004	0.08
			Thallium	Hair	52	- -	0.2	53
			Vanadium	Hair	0.04	- -	0.006	0.04
			Naphthalene	Body Weight	0.003	- -	0.002	0.005
			Chlorobenzene	Liver	0.1	- -	0.03	0.1
			cis-1,2-Dichloroethene	Kidneys	0.2	- -	0.02	0.2
			Vinyl chloride	Liver	0.08	- -	0.004	0.09
			1,4-Dichlorobenzene	Liver	0.002	- -	0.0010	0.003
			Cyanide	Reproductive Effects	1	- -	0.006	1
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA		Not Site Related		NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA		Not Site Related		NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	--	70	--	7	77
	Exposure Medium Total							77
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								77
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	None Reported	0.010	- -	0.01	0.02
			Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Radium-226	NA		Not site related		NV
			Radium-228	NA		Not Site Related		NV
			Chemical Total	--	0.7	--	0.1	0.7
	Exposure Medium Total							0.7

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	Background constituent			0.00
			Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Thorium-234	NA	Not Site Related			NV
			Chemical Total	--	0.00	--	0.005	0.01
	Exposure Medium Total							0.01
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Hair	Background Constituent			0.0
			Dioxin-like PCBs	Development	0.08	- -	0.04	0.1
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	--	0.5	--	0.1	0.6
	Exposure Medium Total							0.6
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	Thyroid	8	- -	0.3	8
			Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	Autoimmune Effects	0.02	- -	0.0085	0.03
			2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not site related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	--	9	--	0.5	9
	Exposure Medium Total							9
Sediment Total								11

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.006	0.008
			Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	1	1
	Exposure Medium Total							1
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total	--	0.1	--	0.01	0.1
	Exposure Medium Total							0.1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Hair	Background Constituent			0.00
			Cyanide	Reproductive Effects	Background Constituent			0.000
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.3	--	0.8	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs		NV	- -	- -	NV
			Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	Thyroid	Background Constituent			0.0
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Blood, Immune System	Background Constituent			0.0
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		Not Site Related			NV
			Chemical Total	--	101	--	--	101
	Exposure Medium Total							101

TABLE 9.50

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	0.26	- -	- -	0.26
			4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	Background Constituent			0
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		Not Site Related			NV
			Chemical Total	--	11	--	--	11
	Exposure Medium Total							11
Tissue Ingestion Total								112

Total Hazard Index Across All Media	302

Total Neurological HI =	4
Total Body and Organ Weight HI =	0.9
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	3
Total Adrenal Glands HI =	0.000007
Total Eyes HI =	52
Total Immune System HI =	52
Total Nails HI =	52
Total Longevity HI =	4
Total Kidneys HI =	1
Total Gastrointestinal Tract HI =	5
Total None Reported HI =	0.8
Total Thyroid HI =	25
Total Reproductive Effects HI =	1
Total Hair HI =	60
Total Teeth HI =	0.1
Total Development HI =	145
Total Urinary Tract HI =	0.0001
Total Fetotoxicity HI =	0.0008
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.04
Total Endocrine System HI =	0.01

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil						
			1,2,4-Trichlorobenzene	Adrenal glands	0.0000006	- -	0.00000007	0.0000007
			Chlorobenzene	Liver	0.002	- -	0.0003	0.002
			1,4-Dichlorobenzene	Liver	0.00002	- -	0.000007	0.00002
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.002	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.0003	- -	0.0001	0.0004
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Dieldrin	Liver	0.00005	- -	0.00002	0.00008
			4,4'-DDT	Liver	0.000008	- -	0.000001	0.000010
			Heptachlor epoxide	Liver	0.0008	- -	0.0004	0.001
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	3	- -	2	6
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.04	- -	0.002	0.04
			Antimony	Blood and longevity	0.08	- -	0.02	0.1
			Arsenic	Skin/Vascular	0.03	- -	0.007	0.04
			Barium	Kidneys	0.002	- -	0.001	0.003
			Beryllium	Gastrointestinal Tract	0.001	- -	0.006	0.008
			Cadmium	Kidneys	0.02	- -	0.004	0.03
			Chromium (Total)	None Reported	0.002	- -	0.006	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.003	0.005
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Copper	Gastrointestinal Tract	0.1	- -	0.006	0.2
			Cyanide	Reproductive effects	0.0008	- -	0.00003	0.0008
			Iron	Gastrointestinal Tract	0.1	- -	0.005	0.1
			Manganese	Neurological	0.02	- -	0.02	0.05
			Nickel	Body and Organ weights	0.03	- -	0.04	0.07
			Selenium	Hair, nails, blood, teeth, skin, central nervous system	0.0009	- -	0.00004	0.0009
			Silver	Skin	0.001	- -	0.001	0.002
			Thallium	Hair	0.5	- -	0.02	0.5
			Vanadium	Hair	0.02	- -	0.04	0.06
			Zinc	Blood and immune system	0.02	- -	0.0009	0.02
			Mercury	Autoimmune effects	0.02	- -	0.0110	0.03
			Dioxin-like PCBs	Development	2	- -	1	3
			2,3,7,8-TCDD TEQ	Development	0.5	- -	0.1	0.6
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Thorium-234	NA	Not Site Related			NV
			Uranium-235	NA	Not Site Related			NV
			Chemical Total	- -	7	- -	3	11
	Exposure Medium Total							11

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions						
			1,2,4-Trichlorobenzene	Urinary tract	- -	0.00010	- -	0.00010
			Chlorobenzene	Liver, kidneys	- -	0.09	- -	0.09
			1,4-Dichlorobenzene	Liver	- -	0.00010	- -	0.00010
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0003	- -	0.0003
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Dieldrin	NA	- -	NV	- -	NV
			4,4'-DDT	NA	- -	NV	- -	NV
			Heptachlor epoxide	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.005	- -	0.005
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0005	- -	0.0005
			Beryllium	Respiratory system, Immune system	- -	0.00006	- -	0.00006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.00003	- -	0.00003
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Cyanide	Thyroid	- -	0.0000003	- -	0.0000003
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.007	- -	0.007
			Nickel	Respiratory System	- -	0.004	- -	0.004
			Selenium	Liver, cardiovascular system, neurological	- -	0.0000001	- -	0.0000001
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.0007	- -	0.0007
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	2	- -	2
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.01	- -	0.01
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total		--	2	--	2
	Exposure Medium Total							2

TABLE 9.51

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil Total								12
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.02	- -	0.0001	0.02
			Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Barium	Kidneys	0.05	- -	0.004	0.05
			Cadmium	Kidneys	0.04	- -	0.005	0.05
			Chromium (Trivalent)	None Reported	0.00009	- -	0.00004	0.0001
			Chromium (Hexavalent)	None Reported	0.1	- -	0.06	0.2
			Cobalt	Thyroid	5	- -	0.011	5
			Iron	Gastrointestinal Tract	0.7	- -	0.004	0.8
			Manganese	Neurological	0.5	- -	0.07	0.6
			Mercury	Autoimmune Effects	0.05	- -	0.0003	0.05
			Nickel	Body and Organ Weights	0.03	- -	0.004	0.04
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.05	- -	0.0003	0.05
			Thallium	Hair	31	- -	0.2	32
			Vanadium	Hair	0.02	- -	0.005	0.03
			Naphthalene	Body Weight	0.002	- -	0.001	0.003
			Chlorobenzene	Liver	0.06	- -	0.02	0.08
			cis-1,2-Dichloroethene	Kidneys	0.1	- -	0.01	0.2
			Vinyl chloride	Liver	0.05	- -	0.003	0.05
			1,4-Dichlorobenzene	Liver	0.0010	- -	0.0006	0.002
			Cyanide	Reproductive Effects	0.8	- -	0.003	0.8
			Dioxin-Like PCBs	Development	0.005	- -	0.2	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	- -	42	--	4	46
	Exposure Medium Total							46

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Inhalation while Showering	Naphthalene	Nasal, Respiratory	- -	0.01	- -	0.01
			1,4-Dichlorobenzene	Liver	- -	0.0001	- -	0.0001
			Chlorobenzene	Liver, Kidneys	- -	0.04	- -	0.04
			cis-1,2-Dichloroethene	NA	- -	NV	- -	NV
			Vinyl chloride	Liver	- -	0.003	- -	0.003
			High Risk PCBs	NA	- -	NV	- -	NV
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00003	- -	0.00003
			2,3,7,8-TCDD	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0006	- -	0.0006
			Cyanide	Thyroid	- -	0.6	- -	0.6
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								47
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	NA	Not site related			NV
			Radium-228	NA	Not Site Related			NV
			Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total							0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	Background constituent			0.000
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Thorium-234	NA	Not Site Related			NV
			Chemical Total		0.000	--	0.002	0.003
	Exposure Medium Total							0.003
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Hair	Background Constituent			0.00
			Dioxin-like PCBs	Development	0.007	- -	0.02	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total							0.1

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.0010
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	Autoimmune Effects	0.002	- -	0.0041	0.006
			2,3,7,8-TCDD TEQ	Development	0.003	- -	0.001	0.004
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not site related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		0.8	--	0.2	1
	Exposure Medium Total							1
Sediment Total								1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total		0.02	--	0.00	0.03
	Exposure Medium Total							0.03
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	Gastrointestinal Tract	0.00009	- -	0.00001	0.0001
			Thallium	Hair	Background Constituent			0.00
			Cyanide	Reproductive Effects	Background Constituent			0.0000
			Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.06	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water Total								0.9

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Thyroid	Background Constituent			0.0
			Copper	Gastrointestinal Tract	Background Constituent			0.00
			Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Blood, Immune System	Background Constituent			0.0
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		59	--	--	59
	Exposure Medium Total							59

TABLE 9.51
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	None Reported	0.09	- -	- -	0.09
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	Background Constituent			0
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		9	--	--	9
	Exposure Medium Total							9
Tissue Ingestion Total								68

	130
Total Neurological HI =	3
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1
Total Blood HI =	2
Total Skin/Vascular HI =	2
Total Adrenal Glands HI =	0.0000007
Total Eyes HI =	7
Total Immune System HI =	7
Total Nails HI =	7
Total Longevity HI =	2
Total Kidneys HI =	0.4
Total Gastrointestinal Tract HI =	1
Total None Reported HI =	0.4
Total Thyroid HI =	8
Total Reproductive Effects HI =	0.8
Total Hair HI =	32
Total Teeth HI =	0.1
Total Development HI =	73
Total Urinary Tract HI =	0.0001
Total Fetotoxicity HI =	0.0008
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.05
Total Endocrine System HI =	0.01

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil					
			1,2,4-Trichlorobenzene	2.E-10	- -	2.E-11	2.E-10
			Chlorobenzene	NV	- -	NV	NV
			1,4-Dichlorobenzene	8.E-09	- -	2.E-09	1.E-08
			Benzo(a)anthracene	6.E-07	- -	2.E-07	8.E-07
			Benzo(a)pyrene	6.E-06	- -	2.E-06	7.E-06
			Benzo(b)fluoranthene	4.E-07	- -	1.E-07	5.E-07
			Bis(2-ethylhexyl)phthalate	1.E-07	- -	3.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	2.E-06
			Indeno(1,2,3-cd)pyrene	3.E-07	- -	1.E-07	5.E-07
			Dieldrin	5.E-08	- -	1.E-08	7.E-08
			4,4'-DDT	2.E-09	- -	1.E-10	2.E-09
			Heptachlor epoxide	1.E-07	- -	3.E-08	2.E-07
			Aroclor 1248	3.E-04	- -	1.E-04	4.E-04
			Aroclor 1254	2.E-04	- -	7.E-05	2.E-04
			Aroclor 1260	8.E-05	- -	3.E-05	1.E-04
			High Risk PCB Congeners	2.E-03	- -	8.E-04	3.E-03
			Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Barium	NV	- -	NV	NV
			Beryllium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-05	- -	2.E-05	3.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Cyanide	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Silver	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Zinc	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Dioxin-like PCBs	2.E-04	- -	7.E-05	3.E-04
			2,3,7,8-TCDD TEQ	5.E-05	- -	5.E-06	6.E-05
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	9.E-04	- -	1.E-02	1.E-02
			Cesium-137	Not Site Related			0.E+00
			Lead-210	1.E-03	- -	8.E-06	1.E-03
			Lead-212	Not Site Related			0.E+00
			Lead-214	1.E-03	- -	1.E-02	1.E-02
			Potassium-40	Not Site Related			0.E+00
			Protactinium-234M	Not Site Related			0.E+00
			Radium-226	2.E-04	- -	2.E-03	3.E-03
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Thorium-234	Not Site Related			0.E+00
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	6.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions					
			1,2,4-Trichlorobenzene	- -	NV	- -	NV
			Chlorobenzene	- -	NV	- -	NV
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Benzo(a)anthracene	- -	1.E-08	- -	1.E-08
			Benzo(a)pyrene	- -	4.E-10	- -	4.E-10
			Benzo(b)fluoranthene	- -	3.E-11	- -	3.E-11
			Bis(2-ethylhexyl)phthalate	- -	3.E-12	- -	3.E-12
			Dibenzo(a,h)anthracene	- -	1.E-10	- -	1.E-10
			Indeno(1,2,3-cd)pyrene	- -	2.E-11	- -	2.E-11
			Dieldrin	- -	3.E-12	- -	3.E-12
			4,4'-DDT	- -	9.E-14	- -	9.E-14
			Heptachlor epoxide	- -	6.E-12	- -	6.E-12
			Aroclor 1248	- -	3.E-05	- -	3.E-05
			Aroclor 1254	- -	1.E-05	- -	1.E-05
			Aroclor 1260	- -	4.E-06	- -	4.E-06
			High Risk PCB Congeners	- -	3.E-04	- -	3.E-04
			Aluminum	- -	NV	- -	NV
			Antimony	- -	NV	- -	NV
			Arsenic	- -	2.E-08	- -	2.E-08
			Barium	- -	NV	- -	NV
			Beryllium	- -	1.E-09	- -	1.E-09
			Cadmium	- -	9.E-09	- -	9.E-09
			Chromium (Total)	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	3.E-07	- -	3.E-07
			Cobalt	- -	4.E-07	- -	4.E-07
			Copper	- -	NV	- -	NV
			Cyanide	- -	NV	- -	NV
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Nickel	- -	4.E-08	- -	4.E-08
			Selenium	- -	NV	- -	NV
			Silver	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV
			Zinc	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Dioxin-like PCBs	- -	6.E-06	- -	6.E-06
			2,3,7,8-TCDD TEQ	- -	2.E-06	- -	2.E-06
			Bismuth-212		Not Site Related		0.E+00
			Bismuth-214	- -	1.E-06	- -	1.E-06
			Cesium-137		Not Site Related		0.E+00
			Lead-210	- -	2.E-06	- -	2.E-06
			Lead-212		Not Site Related		0.E+00
			Lead-214	- -	1.E-06	- -	1.E-06
			Potassium-40		Not Site Related		0.E+00
			Protactinium-234M		Not Site Related		0.E+00
			Radium-226	- -	5.E-07	- -	5.E-07
			Radium-228		Not Site Related		0.E+00
			Thallium-208		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00
			Uranium-235		Not Site Related		0.E+00
			Chemical Total	--	3.E-04	--	3.E-04
	Exposure Medium Total						3.E-04
Soil Total							3.E-02

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-04	- -	1.E-06	3.E-04
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Trivalent)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Naphthalene	NV	- -	NV	NV
			Chlorobenzene	NV	- -	NV	NV
			cis-1,2-Dichloroethene	NV	- -	NV	NV
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			1,4-Dichlorobenzene	2.E-07	- -	1.E-07	3.E-07
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-212	Not Site Related			0.E+00
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Potassium-40	Not Site Related			0.E+00
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Radium-228	Not Site Related			0.E+00
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Naphthalene	- -	4.E-07	- -	4.E-07
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Chlorobenzene	- -	NV	- -	NV
			cis-1,2-Dichloroethene	- -	NV	- -	NV
			Vinyl chloride	- -	4.E-07	- -	4.E-07
			High Risk PCBs	- -	2.E-07	- -	2.E-07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08
			2,3,7,8-TCDD	- -	3.E-07	- -	3.E-07
			Cyanide	- -	NV	- -	NV
			Bismuth-214	- -	NV	- -	NV
			Lead-210	- -	NV	- -	NV
			Lead-212	Not Site Related			0.E+00
			Lead-214	- -	NV	- -	NV
			Potassium-40	Not Site Related			0.E+00
			Radium-226	- -	2.E-01	- -	2.E-01
			Radium-228	Not Site Related			0.E+00
			Strontium-90	- -	NV	- -	NV
			Chemical Total	- -	1.E-06	- -	2.E-01
	Exposure Medium Total						2.E-01
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Radium-226	Not site related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background constituent			0.E+00
			Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06
			Lead-212	Not Site Related			0.E+00
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Thorium-234	Not Site Related			0.E+00
			Chemical Total	4.E-06	--	1.E-05	1.E-05
	Exposure Medium Total						1.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	3.E-07	5.E-07
			Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	Background Constituent			NV
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-07	4.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	2.E-07	- -	9.E-07	1.E-06
			Cesium-137	Not Site Related			0.E+00
			Lead-212	Not Site Related			0.E+00
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-08	- -	1.E-07	2.E-07
			Benzo(a)pyrene	5.E-07	- -	9.E-07	1.E-06
			Benzo(b)fluoranthene	5.E-08	- -	9.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Aroclor 1254	2.E-07	- -	6.E-07	8.E-07
			Aroclor 1260	2.E-07	- -	8.E-07	1.E-06
			Antimony	NV	- -	NV	NV
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-07	- -	2.E-07	5.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07
			Lead-212	Not Site Related			0.E+00
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-226	Not site related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	1.E-05	--	5.E-05	6.E-05
	Exposure Medium Total						6.E-05
Sediment Total							4.E-04
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	4.E-07	- -	3.E-08	5.E-07
			Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05

TABLE 9.52
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	7.E-08	5.E-07
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	2.E-10	- -	4.E-08	4.E-08
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00
			Potassium-40	Not Site Related			0.E+00
			Chemical Total	7.E-07	--	1.E-06	2.E-06
	Exposure Medium Total						2.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	8.E-08	5.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	Background Constituent			NV
			Cyanide	Background Constituent			NV
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			Dieldrin	Background Constituent			0.E+00
			4,4'-DDD	Background Constituent			0.E+00
			4,4'-DDE	Background Constituent			0.E+00
			4,4'-DDT	Background Constituent			0.E+00
			Aroclor 1254	Background Constituent			0.E+00
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Aluminum	Background Constituent			NV
			Arsenic	Background Constituent			0.E+00
			Chromium (Hexavalent)	3.E-06	- -	- -	3.E-06
			Cobalt	Background Constituent			NV
			Copper	Background Constituent			NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	Background Constituent			NV
			Zinc	Background Constituent			NV
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	Not Site Related			0.E+00
			Lead-214	2.E-04	- -	- -	2.E-04
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	4.E-06	- -	- -	4.E-06
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	3.E-03	--	--	3.E-03
	Exposure Medium Total						3.E-03

TABLE 9.52

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00
			Aldrin	7.E-06	- -	- -	7.E-06
			Dieldrin	Background Constituent			0.E+00
			4,4'-DDD	6.E-07	- -	- -	6.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Arsenic	Background Constituent			0.E+00
			Cadmium	Background Constituent			NV
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05
			Cobalt	NV	- -	- -	NV
			Copper	Background Constituent			NV
			Iron	NV	- -	- -	NV
			Zinc	Background Constituent			NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	Not Site Related			0.E+00
			Lead-214	6.E-05	- -	- -	6.E-05
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	3.E-06	- -	- -	3.E-06
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	6.E-04	--	--	6.E-04
	Exposure Medium Total						6.E-04
Tissue Ingestion Total							4.E-03

3.E-01

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil						
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.07	- -	0.02	0.10
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.009	- -	0.002	0.01
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	2	- -	0.5	2
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	1	- -	0.03	1
			Antimony	Blood and longevity	1	- -	0.2	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Barium	Kidneys	0.03	- -	0.009	0.04
			Cadmium	Kidneys	0.3	- -	0.02	0.3
			Chromium (Total)	None Reported	0.003	- -	0.006	0.009
			Chromium (Hexavalent)	None Reported	0.08	- -	0.07	0.1
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.05	2
			Iron	Gastrointestinal Tract	3	- -	0.07	3
			Manganese	Neurological	0.4	- -	0.2	0.6
			Nickel	Body and Organ weights	0.2	- -	0.1	0.4
			Silver	Skin	0.02	- -	0.01	0.04
			Thallium	Hair	13	- -	0.3	13
			Vanadium	Hair	0.7	- -	0.6	1
			Zinc	Blood and immune system	0.3	- -	0.008	0.3
			Mercury	Autoimmune effects	0.3	- -	0.1	0.4
			Dioxin-like PCBs	Development	4	- -	1	6
			2,3,7,8-TCDD TEQ	Development	9	- -	1	10
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Protactinium-234M	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Thorium-234	NA	Not Site Related			NV
			Uranium-235	NA	Not Site Related			NV
			Chemical Total	- -	45	- -	5	50
	Exposure Medium Total							50

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions						
			Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0006	- -	0.0006
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.01	- -	0.01
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0006	- -	0.0006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.010	- -	0.010
			Nickel	Respiratory System	- -	0.003	- -	0.003
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.002	- -	0.002
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	3	- -	3
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.006	- -	0.006
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total		--	3	--	3
	Exposure Medium Total							3
Soil Total								53

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.04	- -	0.0002	0.04
			Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Barium	Kidneys	0.08	- -	0.005	0.09
			Cadmium	Kidneys	0.07	- -	0.007	0.08
			Chromium (Trivalent)	None Reported	0.0001	- -	0.00005	0.0002
			Chromium (Hexavalent)	None Reported	0.2	- -	0.07	0.3
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Mercury	Autoimmune Effects	0.08	- -	0.0004	0.09
			Nickel	Body and Organ Weights	0.05	- -	0.001	0.05
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.08	- -	0.0004	0.08
			Thallium	Hair	52	- -	0.2	53
			Vanadium	Hair	0.04	- -	0.006	0.04
			Naphthalene	Body Weight	0.003	- -	0.002	0.005
			Chlorobenzene	Liver	0.1	- -	0.03	0.1
			cis-1,2-Dichloroethene	Kidneys	0.2	- -	0.02	0.2
			Vinyl chloride	Liver	0.08	- -	0.004	0.09
			1,4-Dichlorobenzene	Liver	0.002	- -	0.0010	0.003
			Cyanide	Reproductive Effects	1	- -	0.006	1
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA		Not Site Related		NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA		Not Site Related		NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	--	70	--	7	77
	Exposure Medium Total							77
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								77

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.006	- -	0.003	0.009
			Arsenic	Skin, Vascular	0.03	- -	0.006	0.04
			Chromium (Hexavalent)	None Reported	0.010	- -	0.01	0.02
			Cobalt	Thyroid	0.10	- -	0.003	0.10
			Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Radium-226	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Chemical Total	--	0.7	--	0.06	0.7
	Exposure Medium Total							0.7
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular	Background Constituent			0.00
			Chromium (Hexavalent)	None Reported	0.004	- -	0.005	0.009
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Thorium-234	NA	Not Site Related			NV
			Chemical Total	--	0.00	--	0.005	0.01
	Exposure Medium Total							0.01
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.001	- -	0.0005	0.002
			Arsenic	Skin, Vascular	0.02	- -	0.003	0.02
			Chromium (Hexavalent)	None Reported	0.06	- -	0.08	0.1
			Cobalt	Thyroid	0.3	- -	0.01	0.3
			Thallium	Hair	Background Constituent			0.0
			Dioxin-like PCBs	Development	0.08	- -	0.01	0.08
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.002	0.02
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	--	0.5	--	0.1	0.6
	Exposure Medium Total							0.6

TABLE 9.53
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.003	- -	0.001	0.005
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.04	- -	0.02	0.05
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.05	- -	0.01	0.07
			Arsenic	Skin, Vascular	0.03	- -	0.005	0.03
			Chromium (Total)	None Reported	0.002	- -	0.005	0.007
			Chromium (Hexavalent)	None Reported	0.008	- -	0.01	0.02
			Cobalt	Thyroid	8	- -	0.3	8
			Copper	Gastrointestinal Tract	0.009	- -	0.0003	0.009
			Iron	Gastrointestinal Tract	0.04	- -	0.001	0.04
			Nickel	Body and Organ Weights	0.1	- -	0.1	0.3
			Thallium	Hair	0.4	- -	0.01	0.4
			Mercury	Autoimmune Effects	0.02	- -	0.0006	0.02
			2,3,7,8-TCDD TEQ	Development	0.03	- -	0.003	0.03
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	--	9	--	0.5	9
	Exposure Medium Total							9
Sediment Total								10
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.002	- -	0.006	0.008
			Iron	Gastrointestinal Tract	0.006	- -	0.0003	0.006
			Thallium	Hair	0.08	- -	0.004	0.08
			2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.1	--	0.9	1
	Exposure Medium Total							1

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.001	0.001
			Iron	Gastrointestinal Tract	0.0004	- -	0.00002	0.0004
			Thallium	Hair	0.1	- -	0.006	0.1
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total	--	0.1	--	0.01	0.1
	Exposure Medium Total							0.1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.007	- -	0.0003	0.007
			Chromium (Hexavalent)	None Reported	0.02	- -	0.06	0.08
			Cobalt	Thyroid	0.3	- -	0.006	0.3
			Iron	Gastrointestinal Tract	0.0005	- -	0.00002	0.0005
			Thallium	Hair	Background Constituent			0.00
			Cyanide	Reproductive Effects	0.002	- -	0.0001	0.002
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0006	- -	0.06	0.06
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total	--	0.3	--	0.8	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.1	- -	- -	0.1
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs		NV	- -	- -	NV
			Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.007	- -	- -	0.007
			Cobalt	Thyroid	Background Constituent			0.0
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Blood, Immune System	Background Constituent			0.0
			Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		Not Site Related			NV
			Chemical Total	--	101	--	--	101
	Exposure Medium Total							101

TABLE 9.53

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	Liver	0.04	- -	- -	0.04
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	0.26	- -	- -	0.26
			4,4'-DDE	Liver	0.07	- -	- -	0.07
			Heptachlor epoxide	Liver	0.2	- -	- -	0.2
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	None Reported	0.1	- -	- -	0.1
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	Background Constituent			0
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Bismuth-214		NV	- -	- -	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	- -	- -	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	- -	- -	NV
			Uranium-235		Not Site Related			NV
			Chemical Total	--	11	--	--	11
	Exposure Medium Total							11
Tissue Ingestion Total								112

Total Hazard Index Across All Media	254
Total Neurological HI =	6
Total Body and Organ Weight HI =	0.7
Total Liver HI =	1
Total Blood HI =	4
Total Skin/Vascular HI =	3
Total Adrenal Glands HI =	0.000000
Total Eyes HI =	4
Total Immune System HI =	5
Total Nails HI =	4
Total Longevity HI =	4
Total Kidneys HI =	1
Total Gastrointestinal Tract HI =	7
Total None Reported HI =	0.8
Total Thyroid HI =	25
Total Reproductive Effects HI =	1
Total Hair HI =	68
Total Teeth HI =	0.1
Total Development HI =	131
Total Urinary Tract HI =	0.00000
Total Fetotoxicity HI =	0.0012
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.03
Total Endocrine System HI =	0.01

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil						
			Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.007	- -	0.004	0.01
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Bis(2-ethylhexyl)phthalate	Liver	0.0008	- -	0.0004	0.001
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Indeno(1,2,3-cd)pyrene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, nails, immune system	0.1	- -	0.09	0.2
			Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	NA	NV	- -	NV	NV
			Aluminum	Neurological	0.1	- -	0.005	0.1
			Antimony	Blood and longevity	0.1	- -	0.03	0.1
			Arsenic	Skin/Vascular	0.04	- -	0.007	0.04
			Barium	Kidneys	0.003	- -	0.002	0.004
			Cadmium	Kidneys	0.02	- -	0.004	0.03
			Chromium (Total)	None Reported	0.0003	- -	0.0009	0.001
			Chromium (Hexavalent)	None Reported	0.007	- -	0.01	0.02
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Copper	Gastrointestinal Tract	0.2	- -	0.008	0.2
			Iron	Gastrointestinal Tract	0.3	- -	0.01	0.3
			Manganese	Neurological	0.03	- -	0.04	0.07
			Nickel	Body and Organ weights	0.02	- -	0.02	0.04
			Silver	Skin	0.002	- -	0.002	0.005
			Thallium	Hair	1	- -	0.05	1
			Vanadium	Hair	0.06	- -	0.1	0.2
			Zinc	Blood and immune system	0.03	- -	0.001	0.03
			Mercury	Autoimmune effects	0.03	- -	0.018	0.05
			Dioxin-like PCBs	Development	0.4	- -	0.2	0.6
			2,3,7,8-TCDD TEQ	Development	0.9	- -	0.1	1
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total	- -	4	- -	1	5
	Exposure Medium Total							5

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions	Benzo(a)anthracene	NA	- -	NV	- -	NV
			Benzo(a)pyrene	Fetotoxicity	- -	0.0006	- -	0.0006
			Benzo(b)fluoranthene	NA	- -	NV	- -	NV
			Bis(2-ethylhexyl)phthalate	NA	- -	NV	- -	NV
			Dibenzo(a,h)anthracene	NA	- -	NV	- -	NV
			Indeno(1,2,3-cd)pyrene	NA	- -	NV	- -	NV
			Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	NA	- -	NV	- -	NV
			Aroclor 1260	NA	- -	NV	- -	NV
			High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	Neurological	- -	0.01	- -	0.01
			Antimony	NA	- -	NV	- -	NV
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Barium	Fetotoxicity	- -	0.0006	- -	0.0006
			Cadmium	Kidneys	- -	0.001	- -	0.001
			Chromium (Total)	NA	- -	NV	- -	NV
			Chromium (Hexavalent)	Respiratory System	- -	0.0001	- -	0.0001
			Cobalt	Respiratory System	- -	0.02	- -	0.02
			Copper	NA	- -	NV	- -	NV
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.010	- -	0.010
			Nickel	Respiratory System	- -	0.003	- -	0.003
			Silver	NA	- -	NV	- -	NV
			Thallium	NA	- -	NV	- -	NV
			Vanadium	Respiratory System	- -	0.002	- -	0.002
			Zinc	NA	- -	NV	- -	NV
			Mercury	Neurological	- -	3	- -	3
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.003	- -	0.003
			2,3,7,8-TCDD TEQ	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.006	- -	0.006
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	- -	NV	- -	NV
			Cesium-137	NA		Not Site Related		NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA		Not Site Related		NV
			Protactinium-234M	NA		Not Site Related		NV
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Uranium-235	NA		Not Site Related		NV
			Chemical Total		--	3	--	3
	Exposure Medium Total							3
Soil Total								8

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	Neurological	0.02	- -	0.0001	0.02
			Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Barium	Kidneys	0.05	- -	0.004	0.05
			Cadmium	Kidneys	0.04	- -	0.005	0.05
			Chromium (Trivalent)	None Reported	0.00009	- -	0.00004	0.0001
			Chromium (Hexavalent)	None Reported	0.1	- -	0.06	0.2
			Cobalt	Thyroid	5	- -	0.011	5
			Iron	Gastrointestinal Tract	0.7	- -	0.004	0.8
			Manganese	Neurological	0.5	- -	0.07	0.6
			Mercury	Autoimmune Effects	0.05	- -	0.0003	0.05
			Nickel	Body and Organ Weights	0.03	- -	0.004	0.04
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	0.05	- -	0.0003	0.05
			Thallium	Hair	31	- -	0.2	32
			Vanadium	Hair	0.02	- -	0.005	0.03
			Naphthalene	Body Weight	0.002	- -	0.001	0.003
			Chlorobenzene	Liver	0.06	- -	0.02	0.08
			cis-1,2-Dichloroethene	Kidneys	0.1	- -	0.01	0.2
			Vinyl chloride	Liver	0.05	- -	0.003	0.05
			1,4-Dichlorobenzene	Liver	0.0010	- -	0.0006	0.002
			Cyanide	Reproductive Effects	0.8	- -	0.003	0.8
			Dioxin-Like PCBs	Development	0.005	- -	2.49E-01	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA	Not Site Related			NV
			Strontium-90	NA	NV	- -	NV	NV
			Chemical Total	- -	42	--	4	46
	Exposure Medium Total							46

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Inhalation while Showering	Naphthalene	Nasal, Respiratory	- -	0.01	- -	0.01
			1,4-Dichlorobenzene	Liver	- -	0.0001	- -	0.0001
			Chlorobenzene	Liver, Kidneys	- -	0.04	- -	0.04
			cis-1,2-Dichloroethene	NA	- -	NV	- -	NV
			Vinyl chloride	Liver	- -	0.003	- -	0.003
			High Risk PCBs	NA	- -	NV	- -	NV
			Dioxin-like PCBs	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.00003	- -	0.00003
			2,3,7,8-TCDD	Liver, development, reproduction, endocrine, respiratory, blood production	- -	0.0006	- -	0.0006
			Cyanide	Thyroid	- -	0.6	- -	0.6
			Bismuth-214	NA	- -	NV	- -	NV
			Lead-210	NA	- -	NV	- -	NV
			Lead-212	NA		Not Site Related		0.00E+00
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA		Not Site Related		0.00E+00
			Radium-226	NA	- -	NV	- -	NV
			Radium-228	NA		Not Site Related		0.00E+00
			Strontium-90	NA	- -	NV	- -	NV
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	Thyroid	- -	0.08	- -	0.08
			Mercury	Neurological	- -	0.2	- -	0.2
			Vinyl chloride	Liver	- -	0.06	- -	0.06
			Chemical Total	--	--	0.3	--	0.3
	Exposure Medium Total							0.3
Groundwater Total								47
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	Neurological	0.0006	- -	0.001	0.002
			Arsenic	Skin, Vascular	0.003	- -	0.003	0.006
			Chromium (Hexavalent)	None Reported	0.0009	- -	0.007	0.008
			Cobalt	Thyroid	0.009	- -	0.002	0.01
			Thallium	Hair	0.03	- -	0.005	0.03
			2,3,7,8-TCDD TEQ	Development	0.02	- -	0.01	0.03
			Radium-226	NA		Not Site Related		NV
			Radium-228	NA		Not Site Related		NV
			Chemical Total		0.06	--	0.03	0.09
	Exposure Medium Total							0.09
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Skin, Vascular		Background Constituent		0.000
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.002	0.003
			Bismuth-212	NA		Not Site Related		NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA		Not Site Related		NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA		Not Site Related		NV
			Radium-226	NA	NV	- -	NV	NV
			Radium-228	NA		Not Site Related		NV
			Thallium-208	NA		Not Site Related		NV
			Thorium-234	NA		Not Site Related		NV
			Chemical Total		0.000	--	0.002	0.003
	Exposure Medium Total							0.003

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	Neurological	0.0001	- -	0.0002	0.0004
			Arsenic	Skin, Vascular	0.001	- -	0.001	0.003
			Chromium (Hexavalent)	None Reported	0.005	- -	0.04	0.05
			Cobalt	Thyroid	0.03	- -	0.005	0.03
			Thallium	Hair	Background Constituent			0.00
			Dioxin-like PCBs	Development	0.007	- -	0.018	0.025
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.001	0.003
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Cesium-137	NA	Not Site Related			NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		0.05	--	0.07	0.1
	Exposure Medium Total							0.1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	NA	NV	- -	NV	NV
			Benzo(a)pyrene	Neurological	0.0003	- -	0.0007	0.0010
			Benzo(b)fluoranthene	NA	NV	- -	NV	NV
			Dibenzo(a,h)anthracene	NA	NV	- -	NV	NV
			Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Eyes, Nails, Immune System	0.003	- -	0.008	0.01
			Aroclor 1260	NA	NV	- -	NV	NV
			Antimony	Blood, Longevity	0.005	- -	0.006	0.01
			Arsenic	Skin, Vascular	0.002	- -	0.002	0.005
			Chromium (Total)	None Reported	0.0002	- -	0.002	0.003
			Chromium (Hexavalent)	None Reported	0.0008	- -	0.006	0.006
			Cobalt	Thyroid	0.7	- -	0.1	0.9
			Copper	Gastrointestinal Tract	0.0008	- -	0.0001	0.0009
			Iron	Gastrointestinal Tract	0.004	- -	0.0007	0.004
			Nickel	Body and Organ Weights	0.01	- -	0.06	0.08
			Thallium	Hair	0.03	- -	0.006	0.04
			Mercury	Autoimmune Effects	0.002	- -	0.0003	0.002
			2,3,7,8-TCDD TEQ	Development	0.003	- -	0.00	0.00
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-226	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		0.8	--	0.2	1
	Exposure Medium Total							1
Sediment Total								1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.0003	- -	0.003	0.003
			Iron	Gastrointestinal Tract	0.001	- -	0.0001	0.001
			Thallium	Hair	0.01	- -	0.002	0.02
			2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.02	--	0.4	0.4
	Exposure Medium Total							0.4

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.00006	- -	0.0006	0.0006
			Iron	Gastrointestinal Tract	0.00007	- -	0.000009	0.00008
			Thallium	Hair	0.02	- -	0.003	0.03
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	Background Constituent			0.00
			Potassium-40	NA	Not Site Related			NV
			Chemical Total		0.02	--	0.00	0.03
	Exposure Medium Total							0.03
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	Skin, Vascular	0.001	- -	0.0002	0.001
			Chromium (Hexavalent)	None Reported	0.003	- -	0.03	0.03
			Cobalt	Thyroid	0.06	- -	0.003	0.06
			Iron	Gastrointestinal Tract	Background Constituent			0.0000
			Thallium	Hair	0.02	- -	0.002	0.02
			Cyanide	Reproductive Effects	0.0004	- -	0.00005	0.0005
			Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			High Risk PCBs	NA	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	Development	0.0001	- -	0.03	0.03
			Radium-226	NA	NV	- -	NV	NV
			Chemical Total		0.08	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water Total								0.9
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.08	- -	- -	0.08
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	Background Constituent			0.00
			4,4'-DDE	Liver	Background Constituent			0.00
			4,4'-DDT	Liver	Background Constituent			0.0
			Aroclor 1254	Eyes, Nails, Immune System	Background Constituent			0
			High Risk PCBs		NV	--	--	NV
			Aluminum	Neurological	Background Constituent			0.0
			Arsenic	Skin, Vascular	Background Constituent			0
			Chromium (Hexavalent)	None Reported	0.004	- -	- -	0.004
			Cobalt	Thyroid	Background Constituent			0.0
			Copper	Gastrointestinal Tract	Background Constituent			0.00
			Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	Neurological	0.2	- -	- -	0.2
			Selenium	Hair, Nails, Blood, Teeth, Skin, Central Nervous System	Background Constituent			0.0
			Zinc	Blood, Immune System	Background Constituent			0.0
			Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		59	--	--	59
	Exposure Medium Total							59

TABLE 9.54

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	NA	Background Constituent			NV
			Aldrin	Liver	0.03	- -	- -	0.03
			Dieldrin	Liver	Background Constituent			0.00
			4,4'-DDD	Liver	0.21	- -	- -	0.21
			4,4'-DDE	Liver	0.06	- -	- -	0.06
			Heptachlor epoxide	Liver	0.1	- -	- -	0.1
			Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCBs		NV	--	--	NV
			Arsenic	Skin, Vascular	Background Constituent			0
			Cadmium	Kidneys	Background Constituent			0.0
			Chromium (Hexavalent)	None Reported	0.09	- -	- -	0.09
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Copper	Gastrointestinal Tract	Background Constituent			0.0
			Iron	Gastrointestinal Tract	0.1	- -	- -	0.1
			Zinc	Blood, Immune System	Background Constituent			0
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Bismuth-214		NV	--	--	NV
			Cesium-137		Not Site Related			NV
			Lead-214		NV	--	--	NV
			Potassium-40		Not Site Related			NV
			Radium-228		Not Site Related			NV
			Strontium-90		NV	--	--	NV
			Uranium-235		Not Site Related			NV
			Chemical Total		9	--	--	9
	Exposure Medium Total							9
Tissue Ingestion Total								68

	125
Total Neurological HI =	4
Total Body and Organ Weight HI =	0.2
Total Liver HI =	1
Total Blood HI =	2
Total Skin/Vascular HI =	2
Total Adrenal Glands HI =	0.0000000
Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Longevity HI =	2
Total Kidneys HI =	0.3
Total Gastrointestinal Tract HI =	2
Total None Reported HI =	0.4
Total Thyroid HI =	8
Total Reproductive Effects HI =	0.8
Total Hair HI =	33
Total Teeth HI =	0.1
Total Development HI =	71
Total Urinary Tract HI =	0.00000
Total Fetotoxicity HI =	0.0012
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.05
Total Endocrine System HI =	0.01

TABLE 9.55

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil					
			Benzo(a)anthracene	1.E-06	- -	4.E-07	2.E-06
			Benzo(a)pyrene	1.E-05	- -	4.E-06	2.E-05
			Benzo(b)fluoranthene	1.E-06	- -	5.E-07	2.E-06
			Bis(2-ethylhexyl)phthalate	3.E-07	- -	8.E-08	4.E-07
			Dibenzo(a,h)anthracene	3.E-06	- -	1.E-06	5.E-06
			Indeno(1,2,3-cd)pyrene	8.E-07	- -	3.E-07	1.E-06
			Aroclor 1248	1.E-05	- -	5.E-06	2.E-05
			Aroclor 1254	7.E-06	- -	3.E-06	1.E-05
			Aroclor 1260	2.E-05	- -	7.E-06	2.E-05
			High Risk PCB Congeners	3.E-05	- -	1.E-05	5.E-05
			Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-05	- -	6.E-05	1.E-04
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Silver	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Zinc	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Dioxin-like PCBs	4.E-05	- -	2.E-05	6.E-05
			2,3,7,8-TCDD TEQ	1.E-04	- -	8.E-06	1.E-04
			Bismuth-212		Not Site Related		0.E+00
			Bismuth-214	1.E-03	- -	1.E-02	1.E-02
			Cesium-137		Not Site Related		0.E+00
			Lead-210	2.E-03	- -	1.E-05	2.E-03
			Lead-212		Not Site Related		0.E+00
			Lead-214	1.E-03	- -	2.E-02	2.E-02
			Potassium-40		Not Site Related		0.E+00
			Protactinium-234M		Not Site Related		0.E+00
			Radium-226	1.E-05	- -	2.E-04	2.E-04
			Radium-228		Not Site Related		0.E+00
			Thallium-208		Not Site Related		0.E+00
			Thorium-234		Not Site Related		0.E+00
			Uranium-235		Not Site Related		0.E+00
			Chemical Total	5.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02

TABLE 9.55

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Air	Volatile and Fugitive Dust Emissions					
			Benzo(a)anthracene	- -	2.E-08	- -	2.E-08
			Benzo(a)pyrene	- -	8.E-10	- -	8.E-10
			Benzo(b)fluoranthene	- -	9.E-11	- -	9.E-11
			Bis(2-ethylhexyl)phthalate	- -	9.E-12	- -	9.E-12
			Dibenzo(a,h)anthracene	- -	2.E-10	- -	2.E-10
			Indeno(1,2,3-cd)pyrene	- -	5.E-11	- -	5.E-11
			Aroclor 1248	- -	1.E-06	- -	1.E-06
			Aroclor 1254	- -	5.E-07	- -	5.E-07
			Aroclor 1260	- -	9.E-07	- -	9.E-07
			High Risk PCB Congeners	- -	4.E-06	- -	4.E-06
			Aluminum	- -	NV	- -	NV
			Antimony	- -	NV	- -	NV
			Arsenic	- -	2.E-08	- -	2.E-08
			Barium	- -	NV	- -	NV
			Cadmium	- -	9.E-09	- -	9.E-09
			Chromium (Total)	- -	NV	- -	NV
			Chromium (Hexavalent)	- -	1.E-06	- -	1.E-06
			Cobalt	- -	4.E-07	- -	4.E-07
			Copper	- -	NV	- -	NV
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Nickel	- -	2.E-08	- -	2.E-08
			Silver	- -	NV	- -	NV
			Thallium	- -	NV	- -	NV
			Vanadium	- -	NV	- -	NV
			Zinc	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Dioxin-like PCBs	- -	2.E-06	- -	2.E-06
			2,3,7,8-TCDD TEQ	- -	3.E-06	- -	3.E-06
			Bismuth-212		Not Site Related		0.E+00
			Bismuth-214	- -	1.E-06	- -	1.E-06
			Cesium-137		Not Site Related		0.E+00
			Lead-210	- -	3.E-06	- -	3.E-06
			Lead-212		Not Site Related		0.E+00
			Lead-214	- -	2.E-06	- -	2.E-06
			Potassium-40		Not Site Related		0.E+00
			Protactinium-234M		Not Site Related		0.E+00
			Radium-226	- -	3.E-08	- -	3.E-08
			Radium-228		Not Site Related		0.E+00
			Thallium-208		Not Site Related		NV
			Thorium-234		Not Site Related		0.E+00
			Uranium-235		Not Site Related		0.E+00
			Chemical Total	--	2.E-05	--	2.E-05
	Exposure Medium Total						2.E-05
Soil Total							3.E-02

TABLE 9.55

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Aluminum	NV	- -	NV	NV
			Antimony	NV	- -	NV	NV
			Arsenic	3.E-04	- -	1.E-06	3.E-04
			Barium	NV	- -	NV	NV
			Cadmium	NV	- -	NV	NV
			Chromium (Trivalent)	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Selenium	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Vanadium	NV	- -	NV	NV
			Naphthalene	NV	- -	NV	NV
			Chlorobenzene	NV	- -	NV	NV
			cis-1,2-Dichloroethene	NV	- -	NV	NV
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			1,4-Dichlorobenzene	2.E-07	- -	1.E-07	3.E-07
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-212		Not Site Related		0.E+00
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Potassium-40		Not Site Related		0.E+00
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Radium-228		Not Site Related		0.E+00
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Naphthalene	- -	4.E-07	- -	4.E-07
			1,4-Dichlorobenzene	- -	3.E-07	- -	3.E-07
			Chlorobenzene	- -	NV	- -	NV
			cis-1,2-Dichloroethene	- -	NV	- -	NV
			Vinyl chloride	- -	4.E-07	- -	4.E-07
			High Risk PCBs	- -	2.E-07	- -	2.E-07
			Dioxin-like PCBs	- -	1.E-08	- -	1.E-08
			2,3,7,8-TCDD	- -	3.E-07	- -	3.E-07
			Cyanide	- -	NV	- -	NV
			Bismuth-214	- -	NV	- -	NV
			Lead-210	- -	NV	- -	NV
			Lead-212		Not Site Related		0.E+00
			Lead-214	- -	NV	- -	NV
			Potassium-40		Not Site Related		0.E+00
			Radium-226	- -	2.E-01	- -	2.E-01
			Radium-228		Not Site Related		0.E+00
			Strontium-90	- -	NV	- -	NV
			Chemical Total	- -	2.E-01	- -	2.E-01
	Exposure Medium Total						2.E-01

TABLE 9.55

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Cyanide	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			Cobalt	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Radium-226	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Arsenic	Background Constituent			0.E+00
			Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	2.E-07	- -	1.E-06	1.E-06
			Lead-212	Not Site Related			0.E+00
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Thorium-234	Not Site Related			0.E+00
			Chemical Total	4.E-06	--	1.E-05	1.E-05
	Exposure Medium Total						1.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Benzo(a)pyrene	2.E-07	- -	3.E-07	5.E-07
			Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Cobalt	NV	- -	NV	NV
			Thallium	Background Constituent			NV
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			2,3,7,8-TCDD TEQ	2.E-07	- -	2.E-07	4.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	2.E-07	- -	9.E-07	1.E-06
			Cesium-137	Not Site Related			0.E+00
			Lead-212	Not Site Related			0.E+00
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04

TABLE 9.55
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)anthracene	6.E-08	- -	1.E-07	2.E-07
			Benzo(a)pyrene	5.E-07	- -	9.E-07	1.E-06
			Benzo(b)fluoranthene	5.E-08	- -	9.E-08	1.E-07
			Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Aroclor 1254	2.E-07	- -	6.E-07	8.E-07
			Aroclor 1260	2.E-07	- -	8.E-07	1.E-06
			Antimony	NV	- -	NV	NV
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Total)	NV	- -	NV	NV
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Cobalt	NV	- -	NV	NV
			Copper	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Nickel	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	3.E-07	- -	2.E-07	5.E-07
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	1.E-07	- -	8.E-07	9.E-07
			Lead-212	Not Site Related			0.E+00
			Lead-214	2.E-07	- -	1.E-06	1.E-06
			Potassium-40	Not Site Related			0.E+00
			Radium-226	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	1.E-05	--	5.E-05	6.E-05
	Exposure Medium Total						6.E-05
Sediment Total							4.E-04
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Arsenic	4.E-07	- -	3.E-08	5.E-07
			Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Surface Water	Paradise Creek Surface Water	Paradise Creek	Arsenic	4.E-07	- -	7.E-08	5.E-07
			Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Iron	NV	- -	NV	NV
			Thallium	NV	- -	NV	NV
			High Risk PCBs	2.E-10	- -	4.E-08	4.E-08
			2,3,7,8-TCDD TEQ	Background Constituent			0.E+00
			Potassium-40	Not Site Related			0.E+00
			Chemical Total	7.E-07	--	1.E-06	2.E-06
	Exposure Medium Total						2.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Arsenic	4.E-07	- -	8.E-08	5.E-07
			Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Thallium	Background Constituent			NV
			Cyanide	NV	- -	NV	NV
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04

TABLE 9.55
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			Dieldrin	Background Constituent			0.E+00
			4,4'-DDD	Background Constituent			0.E+00
			4,4'-DDE	Background Constituent			0.E+00
			4,4'-DDT	Background Constituent			0.E+00
			Aroclor 1254	Background Constituent			0.E+00
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Aluminum	Background Constituent			NV
			Arsenic	Background Constituent			0.E+00
			Chromium (Hexavalent)	8.E-06	- -	- -	8.E-06
			Cobalt	Background Constituent			NV
			Copper	Background Constituent			NV
			Iron	NV	- -	- -	NV
			Manganese	NV	- -	- -	NV
			Selenium	Background Constituent			NV
			Zinc	Background Constituent			NV
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	Not Site Related			0.E+00
			Lead-214	2.E-04	- -	- -	2.E-04
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	4.E-06	- -	- -	4.E-06
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	3.E-03	--	--	3.E-03
	Exposure Medium Total						3.E-03
Shellfish Tissue	Shellfish Tissue	Ingestion	Benzo(b)fluoranthene	Background Constituent			0.E+00
			Aldrin	7.E-06	- -	- -	7.E-06
			Dieldrin	Background Constituent			0.E+00
			4,4'-DDD	6.E-07	- -	- -	6.E-07
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			Arsenic	Background Constituent			0.E+00
			Cadmium	Background Constituent			NV
			Chromium (Hexavalent)	2.E-04	- -	- -	2.E-04
			Cobalt	NV	- -	- -	NV
			Copper	Background Constituent			NV
			Iron	NV	- -	- -	NV
			Zinc	Background Constituent			NV
			Mercury	NV	- -	- -	NV
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Cesium-137	Not Site Related			0.E+00
			Lead-214	6.E-05	- -	- -	6.E-05
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Strontium-90	3.E-06	- -	- -	3.E-06
			Uranium-235	Not Site Related			0.E+00
			Chemical Total	7.E-04	--	--	7.E-04
	Exposure Medium Total						7.E-04
Tissue Ingestion Total							4.E-03

3.E-01

TABLE 9.56

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Aluminum	Neurological	Background Constituent			0
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Cobalt	Thyroid	4	- -	0.09	4
			Iron	Gastrointestinal Tract	0.8	- -	0.02	0.8
			Manganese	Neurological	0.1	- -	0.08	0.2
			Thallium	Hair	Background Constituent			0
			Vanadium	Hair	0.1	- -	0.1	0.3
			Mercury	Autoimmune effects	0.03	- -	0.0107	0.04
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	- -	5	- -	0.4	6
	Exposure Medium Total							6
	Air	Volatile and Fugitive Dust Emissions	Aluminum	Neurological	Background Constituent			0
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Cobalt	Respiratory System	- -	0.01	- -	0.01
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.004	- -	0.004
			Thallium	NA	Background Constituent			NV
			Vanadium	Respiratory System	- -	0.0004	- -	0.0004
			Mercury	Neurological	- -	0.3	- -	0.3
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	- -	NV	- -	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		--	0.3	--	0.3
	Exposure Medium Total							0.3
Sediment Total								6

Total Hazard Index Across All Media, Complete Dataset	6

Total Neurological HI =	0.5
Total Skin/Vascular HI =	0.4
Total Immune System HI =	0.04
Total Gastrointestinal Tract HI =	0.8
Total Thyroid HI =	4
Total Hair HI =	0.3
Total Development HI =	0.0007
Total Cardiovascular System HI =	0.0007
Total Respiratory System HI =	0.01

TABLE 9.57

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Aluminum	Neurological	Background Constituent			0
			Arsenic	Skin/Vascular	0.03	- -	0.007	0.04
			Chromium (Hexavalent)	None Reported	0.00	- -	0.0	0.0
			Cobalt	Thyroid	0.4	- -	0.01	0.4
			Iron	Gastrointestinal Tract	0.1	- -	0.003	0.1
			Manganese	Neurological	0.01	- -	0.01	0.03
			Thallium	Hair	Background Constituent			0.0
			Vanadium	Hair	0.01	- -	0.02	0.03
			Mercury	Autoimmune effects	0.003	- -	0.0018	0.005
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	NV	- -	NV	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	NV	- -	NV	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total	- -	0.5	- -	0.06	0.5
	Exposure Medium Total							0.5
	Air	Volatile and Fugitive Dust Emissions	Aluminum	Neurological	Background Constituent			0
			Arsenic	Development, Cardiovascular system, Nervous system, Lung, Skin	- -	0.0007	- -	0.0007
			Chromium (Hexavalent)	Respiratory System	- -	0.0000	- -	0.0000
			Cobalt	Respiratory System	- -	0.01	- -	0.01
			Iron	NA	- -	NV	- -	NV
			Manganese	Neurological	- -	0.004	- -	0.004
			Thallium	NA	Background Constituent			NV
			Vanadium	Respiratory System	- -	0.0004	- -	0.0004
			Mercury	Neurological	- -	0.3	- -	0.3
			Bismuth-212	NA	Not Site Related			NV
			Bismuth-214	NA	- -	NV	- -	NV
			Lead-212	NA	Not Site Related			NV
			Lead-214	NA	- -	NV	- -	NV
			Potassium-40	NA	Not Site Related			NV
			Radium-228	NA	Not Site Related			NV
			Thallium-208	NA	Not Site Related			NV
			Chemical Total		--	0.3	--	0.3
	Exposure Medium Total							0.3
Sediment Total								0.8

Total Hazard Index Across All Media, Complete Dataset	0.8

TABLE 9.58

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Aluminum	Background Constituent			0.E+00
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Cobalt	NV	- -	NV	NV
			Iron	NV	- -	NV	NV
			Manganese	NV	- -	NV	NV
			Thallium	Background Constituent			NV
			Vanadium	NV	- -	NV	NV
			Mercury	NV	- -	NV	NV
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	3.E-06	- -	4.E-05	4.E-05
			Lead-212	Not Site Related			0.E+00
			Lead-214	4.E-06	- -	5.E-05	5.E-05
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			0.E+00
			Chemical Total	3.E-05	- -	9.E-05	1.E-04
	Exposure Medium Total						1.E-04
	Air	Volatile and Fugitive Dust Emissions	Aluminum	Background Constituent			0.E+00
			Arsenic	- -	2.E-08	- -	2.E-08
			Cobalt	- -	2.E-07	- -	2.E-07
			Iron	- -	NV	- -	NV
			Manganese	- -	NV	- -	NV
			Thallium	Background Constituent			NV
			Vanadium	- -	NV	- -	NV
			Mercury	- -	NV	- -	NV
			Bismuth-212	Not Site Related			0.E+00
			Bismuth-214	- -	3.E-18	- -	3.E-18
			Lead-212	Not Site Related			0.E+00
			Lead-214	- -	4.E-18	- -	4.E-18
			Potassium-40	Not Site Related			0.E+00
			Radium-228	Not Site Related			0.E+00
			Thallium-208	Not Site Related			NV
			Chemical Total	--	2.E-07	--	2.E-07
	Exposure Medium Total						2.E-07
Sediment Total							1.E-04

Total Risk Across All Media, Complete Dataset	1.E-04

TABLE 10.1
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological	Not a driver for non-cancer effects			0.00
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular	Not a driver for non-cancer effects			0.00
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0.2	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0.1	2
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	6	- -	0.5	6
	Exposure Medium Total						9.E-04						6
Soil Total							9.E-04						6
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.00
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		0.5	--	0.03	0.6
	Exposure Medium Total						2.E-05						0.6
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.000
			Chemical Total	3.E-06	--	4.E-06	6.E-06	Chemical Total			--		0.00
	Exposure Medium Total						6.E-06						0.00
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.3	--	0.01	0.3
	Exposure Medium Total						1.E-04						0.3
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Chemical Total	6.E-06	--	8.E-06	1.E-05	Chemical Total		8	--	0.3	9
	Exposure Medium Total						1.E-05						9
Sediment Total							1.E-04						9
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.000
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	1	1
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total		0.01	--	1	1
	Exposure Medium Total						1.E-05						1

TABLE 10.1

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	Not a driver for non-cancer effects			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.3	--	0.6	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 18

Total Thyroid HI = 10

Total Hair HI = 3

Total Development HI = 4

TABLE 10.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil											
			Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.1	- -	0.3	0.4
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.1	0.4
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	8.E-04	1.E-03	Chemical Total	- -	0.5	- -	0.5	1
	Exposure Medium Total						1.E-03						1
Soil Total							1.E-03						1
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel											
			Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Chemical Total	7.E-07	--	8.E-06	9.E-06	Chemical Total	--	0.00	--	0.0	0.0
	Exposure Medium Total						9.E-06						0.0
Sediment	Freshwater Wetland Sediment	Freshwater Wetland											
			Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Chemical Total	2.E-07	--	3.E-06	3.E-06	Chemical Total	--	0.000	--	0.00	0.00
	Exposure Medium Total						3.E-06						0.00
Sediment	Paradise Creek Sediment	Paradise Creek											
			Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.00	--	0.0	0.0
	Exposure Medium Total						5.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland											
			Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Chemical Total	6.E-07	--	7.E-06	7.E-06	Chemical Total	--	1	--	0.3	1
	Exposure Medium Total						7.E-06						1
Sediment Total							7.E-05						1

TABLE 10.2

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel											
			Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Chemical Total	2.E-07	--	2.E-05	2.E-05	Chemical Total	--	0.002	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland											
			Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	1	1
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.001	--	1	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 4

Total Thyroid HI = 2

Total Development HI = 3

TABLE 10.3

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA				
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development				
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development				
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA				
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA				
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA				
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA				
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -		- -		
	Exposure Medium Total						2.E-03						
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported				
			Chemical Total	4.E-07	--	3.E-06	3.E-06	Chemical Total					
	Exposure Medium Total						3.E-06						
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA				
			Chemical Total	3.E-07	--	2.E-06	2.E-06	Chemical Total					
	Exposure Medium Total						2.E-06						
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported				
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total					
	Exposure Medium Total						2.E-05						
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported				
			Chemical Total	3.E-07	--	2.E-06	3.E-06	Chemical Total					
	Exposure Medium Total						3.E-06						
Sediment Total							3.E-05						
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development				
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA				
			Chemical Total	3.E-06	--	1.E-05	1.E-05	Chemical Total					
	Exposure Medium Total						1.E-05						
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported				
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development				
			Radium-226	6.E-06	- -	8.E-11	6.E-06	Radium-226	NA				
			Chemical Total	7.E-06	--	2.E-05	3.E-05	Chemical Total					
	Exposure Medium Total						3.E-05						
Surface Water Total							4.E-05						

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media:

TABLE 10.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Benzo(a)pyrene	2.E-06	- -	5.E-07	2.E-06	Benzo(a)pyrene	Neurological		Not a risk driver		0.00
			Aroclor 1248	2.E-06	- -	6.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	Not a risk driver				Aroclor 1254	Eyes, Nails, Immune System	0.3	- -	0.09	0.4
			Aroclor 1260	2.E-06	- -	8.E-07	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-06	- -	1.E-06	6.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin, Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	9.E-06	- -	8.E-06	2.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Copper	NV	- -	NV	NV	Copper	Gastrointestinal Tract	0.4	- -	0.009	0.4
			Iron	NV	- -	NV	NV	Iron	Gastrointestinal Tract	0.5	- -	0.01	0.5
			Thallium	NV	- -	NV	NV	Thallium	Hair	2	- -	0.05	2
			Vanadium	NV	- -	NV	NV	Vanadium	Hair	0.1	- -	0.1	0.2
			Dioxin-like PCBs	6.E-06	- -	2.E-06	8.E-06	Dioxin-like PCBs	Development	0.7	- -	0.2	1
			2,3,7,8-TCDD TEQ	1.E-05	- -	9.E-07	1.E-05	2,3,7,8-TCDD TEQ	Development	2	- -	0.1	2
			Bismuth-214	7.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	3.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	8.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	9.E-07	- -	3.E-06	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-04	- -	6.E-04	9.E-04	Chemical Total	- -	7	- -	1	8
	Exposure Medium Total						9.E-04						8
Soil Total							9.E-04						8
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Dioxin-like PCBs	Not a risk driver			0.E+00	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.8	--	0.1	0.9
	Exposure Medium Total						1.E-04						0.9
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Chemical Total	9.E-06	--	9.E-06	2.E-05	Chemical Total		17	--	1	17
	Exposure Medium Total						2.E-05						17
Sediment Total							1.E-04						18

TABLE 10.4
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Paradise Creek Surface Water	Paradise Creek	Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Chemical Total	3.E-07	--	1.E-06	2.E-06	Chemical Total		0.2	--	0.01	0.2
	Exposure Medium Total						2.E-06						0.2
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.5	--	1	1
	Exposure Medium Total						9.E-05						1
Surface Water Total							9.E-05						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	Not a risk driver			0.0
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Iron	NV	- -	- -	NV	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Bismuth-214	2.E-05			2.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		101	--	--	101
	Exposure Medium To						1.E-03						101
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	Not a risk driver			Not a risk driver
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	Not a risk driver			0.0
			Aroclor 1254	7.E-06	- -	- -	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Chromium (Hexavalent)	8.E-05	- -	- -	NV	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.6	- -	- -	0.6
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	- -	- -	NV
			Chemical Total	2.E-04	--	--	1.E-04	Chemical Total		10	--	--	10
	Exposure Medium To						1.E-04						10
Tissue Ingestion Total							1.E-03						110

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 138

Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Gastrointestinal Tract HI =	1
Total Thyroid HI =	19
Total Hair HI =	3
Total Development HI =	111

TABLE 10.5
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Soil	Site Surface Soil	Site Surface Soil	Aroclor 1260	5.E-07	- -	1.E-06	2.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-07	- -	3.E-06	4.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Chromium (Hexavalent)	9.E-07	- -	7.E-06	8.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.16	- -	0.03	0.2
			Dioxin-like PCBs	1.E-06	- -	3.E-06	5.E-06	Dioxin-like PCBs	Development	0.1	- -	0.3	0.4
			2,3,7,8-TCDD TEQ	3.E-06	- -	2.E-06	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.1	0.4
			Bismuth-214	6.E-05	- -	4.E-04	4.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	4.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	6.E-05	- -	5.E-04	5.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	7.E-07	- -	5.E-06	5.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	8.E-04	1.E-03	Chemical Total	- -	0	- -	0	1
	Exposure Medium Total						1.E-03						1
Soil Total							1.E-03						1
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total		0.0	--	0.0	0.0
	Exposure Medium Total						5.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Chemical Total	6.E-07	--	7.E-06	7.E-06	Chemical Total		2	--	1	3
	Exposure Medium Total						7.E-06						3
Sediment Total							6.E-05						3
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.0	--	1	1
	Exposure Medium Total						8.E-05						1
Surface Water Total							8.E-05						1
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver		Not a risk driver		0.00
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	9.E-04	--	--	9.E-04	Chemical Total		59	--	--	59
	Exposure Medium Total						9.E-04						59

TABLE 10.5

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver		Not a risk driver		0.0
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver		Not a risk driver		0.0
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	2.E-04	--	--	2.E-04	Chemical Total		7	--	--	7
	Exposure Medium Total						2.E-04						7
Tissue Ingestion Total							1.E-03						66

Total Risk Across All Media	2.E-03
Total Hazard Index Across All Media	71
Total Eyes HI =	1
Total Immune System HI =	1
Total Nails HI =	1
Total Thyroid HI =	3
Total Development HI =	66

TABLE 10.6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
	Site Surface Soil	Site Surface Soil	High Risk PCB Congeners	1.E-06	- -	8.E-07	2.E-06	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Dioxin-like PCBs	2.E-06	- -	1.E-06	3.E-06	Dioxin-like PCBs	Development		Not a risk driver		0.0
			2,3,7,8-TCDD TEQ	4.E-06	- -	5.E-07	4.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Bismuth-214	1.E-04	- -	8.E-04	9.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	2.E-04	- -	9.E-07	2.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	1.E-03	1.E-03	Lead-214	NA	NV	- -	NV	NV
			Radium-226	2.E-06	- -	1.E-05	1.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.2	- -	0.02	0
	Exposure Medium Total						2.E-03						0
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	4.E-05	4.E-05	Chemical Total		0.0	--	0.0	0.0
	Exposure Medium Total						4.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Chemical Total	9.E-07	--	6.E-06	7.E-06	Chemical Total		1	--	0.3	2
	Exposure Medium Total						7.E-06						2
Sediment Total							5.E-05						2
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	4.E-05	Chemical Total		0.0007	--	0.5	0.5
	Exposure Medium Total						4.E-05						0.5
Surface Water Total							4.E-05						0.5
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver		Not a risk driver		0.00
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Chemical Total	2.E-03	--	--	2.E-03	Chemical Total		59	--	--	59
	Exposure Medium Total						2.E-03						59

TABLE 10.6

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver		Not a risk driver		Not a risk driver
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver		Not a risk driver		Not a risk driver
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver		Not a risk driver		0.0
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Chemical Total	5.E-04	--	--	5.E-04	Chemical Total		8	--	--	8
	Exposure Medium Total						5.E-04						8
Tissue Ingestion Total							3.E-03						67

Total Risk Across All Media: 5.E-03

Total Hazard Index Across All Media: 69

Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Thyroid HI =	2
Total Development HI =	65

TABLE 10.7

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Outdoor Maintenance Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Aroclor 1248	5.E-05	- -	3.E-05	8.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	3.E-05	- -	2.E-05	5.E-05	Aroclor 1254	Eyes, nails, immune system	2	- -	1	4
			Aroclor 1260	2.E-05	- -	9.E-06	2.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	4.E-04	- -	2.E-04	6.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Arsenic	3.E-06	- -	7.E-07	4.E-06	Arsenic	Skin/Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	7.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Dioxin-like PCBs	3.E-05	- -	2.E-05	6.E-05	Dioxin-like PCBs	Development	1	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-05	- -	1.E-06	1.E-05	2,3,7,8-TCDD TEQ	Development	0.3	- -	0.04	0.4
			Bismuth-214	2.E-04	- -	6.E-03	6.E-03	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	3.E-04	- -	5.E-06	3.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	2.E-04	- -	8.E-03	8.E-03	Lead-214	NA	NV	- -	NV	NV
			Radium-226	5.E-05	- -	1.E-03	2.E-03	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-03	- -	2.E-02	2.E-02	Chemical Total	- -	4	- -	2	6
	Exposure Medium Total						2.E-02						6
	Air	Volatile and Fugitive Dust Emissions											
			Aroclor 1248	- -	5.E-06	- -	5.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			Aroclor 1254	- -	3.E-06	- -	3.E-06	Aroclor 1254	NA	- -	NV	- -	NV
			High Risk PCB Congeners		5.E-05		5.E-05	High Risk PCB Congeners	NA		NV		NV
			Chemical Total	--	6.E-05	--	6.E-05	Chemical Total		--	0.0	--	0.0
	Exposure Medium Total						6.E-05						0.0
Soil Total							2.E-02						6

Total Risk Across All Media: 2.E-02

Total Hazard Index Across All Media: 6

Total Eyes HI = 4
Total Immune System HI = 4
Total Nails HI = 4
Total Development HI = 2

TABLE 10.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0.1	1
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	12	- -	3	16
	Exposure Medium Total						1.E-03						16
Soil	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						2.E-06						0.00
Soil Total							1.E-03						16
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Dioxin-like PCBs	1.E-06	- -	6.E-07	2.E-06	Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		1	--	0.1	1
	Exposure Medium Total						1.E-04						1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Aroclor 1248	1.E-06	- -	5.E-07	2.E-06	Aroclor 1248	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	2.E-06	Arsenic	Skin, Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	16	- -	0.6	16
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.7	- -	0.03	0.7
			Chemical Total	9.E-06	--	9.E-06	2.E-05	Chemical Total		17	--	1	17
	Exposure Medium Total						2.E-05						17
Sediment Total							1.E-04						18
Surface Water	Paradise Creek Surface Water	Paradise Creek	Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.2	- -	0.009	0.2
			Chemical Total	3.E-07	--	1.E-06	2.E-06	Chemical Total		0.2	--	0.01	0.2
	Exposure Medium Total						2.E-06						0.2

TABLE 10.8
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	2.E-05	- -	6.E-05	8.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Dioxin-Like PCBs	3.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	0.004	- -	1.0	1.0
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-05	--	7.E-05	9.E-05	Chemical Total		0.5	--	1	1
	Exposure Medium Total						9.E-05						1
Surface Water Total							9.E-05						2
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	Not a risk driver			0.0
			High Risk PCBs	1.E-04	- -	- -	1.E-04	High Risk PCBs		NV	--	;--	NV
			Dioxin-like PCBs	3.E-05	- -	- -	3.E-05	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	8.E-04	- -	- -	8.E-04	2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Chromium (Hexavalent)	5.E-06	- -	- -	5.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Bismuth-214	2.E-05	- -	- -	2.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-05	- -	- -	2.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	1.E-03	--	--	1.E-03	Chemical Total		100	--	--	100
	Exposure Medium Total						1.E-03						100
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	Not a risk driver			0.00
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	Not a risk driver			0.0
			Aroclor 1254	7.E-06	- -	- -	7.E-06	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	5	--	--	5
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	2	--	--	2
			Chromium (Hexavalent)	4.E-06	- -	- -	4.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.6	- -	- -	0.6
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.3	- -	- -	0.3
			Bismuth-214	1.E-05			1.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	4.E-06			4.E-06	Lead-214		NV	- -	- -	NV
			Chemical Total	1.E-04	--	--	1.E-04	Chemical Total		10	--	--	10
	Exposure Medium Total						1.E-04						10
Tissue Ingestion Total							1.E-03						110

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 145

Total Eyes HI =	11
Total Immune System HI =	11
Total Nails HI =	11
Total Thyroid HI =	19
Total Hair HI =	2
Total Development HI =	114

TABLE 10.9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Cobalt	Thyroid	0.6	- -	0.02	0.7
			Dioxin-like PCBs	Development	0.2	- -	0.08	0.2
			Chemical Total		1	--	0.1	1
	Exposure Medium Total							1
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	16	- -	0.6	16
			Chemical Total		16	--	1	16
	Exposure Medium Total							16
Sediment Total								17
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Cobalt	Thyroid	0.5	- -	0.009	0.5
			Dioxin-Like PCBs	Development	0.004	- -	1	1
			Chemical Total		0.5	--	1	1
	Exposure Medium Total							1
Surface Water Total								1

TABLE 10.9

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current/Future
Receptor Population: Subsistence Fisherman
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Manganese	Neurological	0.9	- -	- -	0.9
			Dioxin-like PCBs	Development	8	- -	- -	8
			2,3,7,8-TCDD TEQ	Development	227	- -	- -	227
			Chemical Total		236	--	--	236
	Exposure Medium Total							236
Shellfish Tissue	Shellfish Tissue	Ingestion	Aroclor 1254	Eyes, Nails, Immune System	8	- -	- -	8
			Cobalt	Thyroid	2	- -	- -	2
			Mercury	Development, Neurological	1	- -	- -	1
			Dioxin-like PCBs	Development	19	- -	- -	19
			2,3,7,8-TCDD TEQ	Development	6	- -	- -	6
			Chemical Total		36	--	--	36
	Exposure Medium Total							36
Tissue Ingestion Total								272

Total Hazard Index Across All Media	291

Total Neurological HI =	2
Total Eyes HI =	8
Total Immune System HI =	8
Total Nails HI =	8
Total Thyroid HI =	20
Total Development HI =	262

TABLE 10.10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0.1	0.2
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	5
	Exposure Medium Total						1.E-03						5
Soil	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						3.E-06						0.00
Soil Total							1.E-03						5
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total		0.0	--	0.0	0.0
	Exposure Medium Total						5.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.7	3
			Chemical Total	6.E-07	--	7.E-06	7.E-06	Chemical Total		2	--	1	3
	Exposure Medium Total						7.E-06						3
Sediment Total							6.E-05						3
Surface Water	Estuarine Wetland	Estuarine Wetland	Chromium (Hexavalent)	3.E-06	- -	5.E-05	6.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Dioxin-Like PCBs	1.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.001	- -	1	1
			High Risk PCBs	9.E-09	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			Radium-226	4.E-06	- -	5.E-11	4.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	7.E-05	8.E-05	Chemical Total		0.0	--	1	1
	Exposure Medium Total						8.E-05						1
Surface Water Total							8.E-05						1

TABLE 10.10

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherman
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-06	- -	- -	2.E-06	Chlordane	Liver	Not a risk driver			0.00
			High Risk PCB Congeners	1.E-04	- -	- -	1.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	2.E-05	- -	- -	2.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	7.E-04	- -	- -	7.E-04	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Bismuth-214	5.E-05			5.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	9.E-04	--	--	9.E-04	Chemical Total		59	--	--	59
	Exposure Medium Total						9.E-04						59
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	2.E-06	- -	- -	2.E-06	Aldrin	Liver	Not a risk driver			0.00
			Heptachlor epoxide	2.E-06	- -	- -	2.E-06	Heptachlor epoxide	Liver	Not a risk driver			0.0
			Aroclor 1254	8.E-06	- -	- -	8.E-06	Aroclor 1254	Eyes, Nails, Immune System	1	- -	- -	1
			High Risk PCB Congeners	2.E-05	- -	- -	2.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	4.E-05	- -	- -	4.E-05	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	1.E-05	- -	- -	1.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.4	- -	- -	0.4
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	4.E-05			4.E-05	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-05			2.E-05	Lead-214		NV	- -	- -	NV
			Chemical Total	1.E-04	--	--	1.E-04	Chemical Total		7	--	--	7
	Exposure Medium Total						1.E-04						7
Tissue Ingestion Total							1.E-03						66

Total Risk Across All Media	2.E-03
Total Hazard Index Across All Media	75

Total Eyes HI =	5
Total Immune System HI =	5
Total Nails HI =	5
Total Thyroid HI =	3
Total Development HI =	67

TABLE 10.11

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system	0.6	- -	0.4	1
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development	0.3	- -	0.2	0.5
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development		Not a risk driver		0.0
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0.9	- -	0.5	1
	Exposure Medium Total						2.E-03						1
	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	6.E-06	--	6.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						6.E-06						0.00
Soil Total							2.E-03						1
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	5.E-06	- -	3.E-05	4.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Bismuth-214	2.E-07	- -	1.E-06	2.E-06	Bismuth-214	NA	NV	- -	NV	NV
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	4.E-05	4.E-05	Chemical Total		0.0	--	0.0	0.0
	Exposure Medium Total						4.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	7.E-07	- -	5.E-06	5.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	2
			Lead-214	2.E-07	- -	2.E-06	2.E-06	Lead-214	NA	NV	- -	NV	NV
			Chemical Total	9.E-07	--	6.E-06	7.E-06	Chemical Total		1	--	0.3	2
	Exposure Medium Total						7.E-06						2
Sediment Total							5.E-05						2
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Dioxin-Like PCBs	2.E-08	- -	1.E-05	1.E-05	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			High Risk PCBs	1.E-08	- -	2.E-06	2.E-06	High Risk PCBs	NA	NV	- -	NV	NV
			Radium-226	9.E-06	- -	1.E-10	9.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	3.E-05	4.E-05	Chemical Total		0.0	--	0.5	0.5
	Exposure Medium Total						4.E-05						0.5
Surface Water Total							4.E-05						0.5

TABLE 10.11

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Recreational User/Fisherma
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	4.E-06	- -	- -	4.E-06	Chlordane	Liver		Not a risk driver		0.00
			High Risk PCB Congeners	3.E-04	- -	- -	3.E-04	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	5.E-05	- -	- -	5.E-05	Dioxin-like PCBs	Development	2	--	--	2
			2,3,7,8-TCDD TEQ	1.E-03	- -	- -	1.E-03	2,3,7,8-TCDD TEQ	Development	57	--	--	57
			Chromium (Hexavalent)	2.E-06	- -	- -	2.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Lead-214	2.E-04			2.E-04	Lead-214		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	5.E-06	- -	- -	5.E-06	Aldrin	Liver		Not a risk driver		0.00
			4,4'-DDE	2.E-06	- -	- -	2.E-06	4,4'-DDE	Liver		Not a risk driver		Not a risk driver
			Heptachlor epoxide	4.E-06	- -	- -	4.E-06	Heptachlor epoxide	Liver		Not a risk driver		0.0
			Aroclor 1254	2.E-05	- -	- -	2.E-05	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			High Risk PCB Congeners	5.E-05	- -	- -	5.E-05	High Risk PCB Congeners		NV	--	--	NV
			Dioxin-like PCBs	1.E-04	- -	- -	1.E-04	Dioxin-like PCBs	Development	4	--	--	4
			2,3,7,8-TCDD TEQ	3.E-05	- -	- -	3.E-05	2,3,7,8-TCDD TEQ	Development	1	--	--	1
			Chromium (Hexavalent)	4.E-05	- -	- -	4.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Cobalt	NV	- -	- -	NV	Cobalt	Thyroid	0.5	- -	- -	0.5
			Mercury	NV	- -	- -	NV	Mercury	Development, Neurological	0.2	- -	- -	0.2
			Bismuth-214	2.E-04			2.E-04	Bismuth-214		NV	- -	- -	NV
			Lead-214	6.E-05			6.E-05	Lead-214		NV	- -	- -	NV
			Strontium-90	3.E-06			3.E-06	Strontium-90		NV	- -	- -	NV
			Chemical Total	5.E-04	--	--	5.E-04	Chemical Total		8	--	--	8
	Exposure Medium Total						5.E-04						8
Tissue Ingestion Total							3.E-03						67

Total Risk Across All Media: 5.E-03

Total Hazard Index Across All Media: 70

Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Thyroid HI =	2
Total Development HI =	65

TABLE 10.12

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	1	- -	0.3	2
			Chemical Total		1	--	0.3	2
	Exposure Medium Total							2
Sediment Total								2
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Dioxin-Like PCBs	Development	0.0007	- -	0.5	0.5
			Chemical Total		0.0	--	0.5	0.5
	Exposure Medium Total							0.5
Surface Water Total								0.5
Fish Tissue	Fish Tissue	Ingestion	Chlordane	Liver	0.4	- -	- -	0.4
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Manganese	Neurological	1	- -	- -	1
			Dioxin-like PCBs	Development	10	- -	- -	10
			2,3,7,8-TCDD TEQ	Development	270	- -	- -	270
			Chemical Total		282	--	--	282
	Exposure Medium Total							282
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	Liver	0.3	- -	- -	0.3
			4,4'-DDD	Liver	2	- -	- -	2
			4,4'-DDE	Liver	0.5	- -	- -	0.5
			Heptachlor epoxide	Liver	1	- -	- -	1
			Aroclor 1254	Eyes, Nails, Immune System	14	- -	- -	14
			Cobalt	Thyroid	4	- -	- -	4
			Iron	Gastrointestinal Tract	1	- -	- -	1
			Mercury	Development, Neurological	2	- -	- -	2
			Dioxin-like PCBs	Development	36	- -	- -	36
			2,3,7,8-TCDD TEQ	Development	11	- -	- -	11
			Chemical Total		71	--	--	71
	Exposure Medium Total							71
Tissue Ingestion Total								353

Total Hazard Index Across All Media	355
Total Neurological HI =	3
Total Liver HI =	4
Total Eyes HI =	14
Total Immune System HI =	14
Total Nails HI =	14
Total Gastrointestinal Tract HI =	2
Total Thyroid HI =	6
Total Development HI =	328

TABLE 10.13

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Arsenic	2.E-06	- -	5.E-07	2.E-06
			Chromium (Hexavalent)	9.E-05	- -	2.E-04	3.E-04
			Dioxin-like PCBs	2.E-06	- -	2.E-06	3.E-06
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Lead-214	4.E-07	- -	2.E-06	3.E-06
			Chemical Total	9.E-05	--	2.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Dibenzo(a,h)anthracene	2.E-06	- -	1.E-06	4.E-06
			Aroclor 1248	1.E-06	- -	1.E-06	3.E-06
			Arsenic	3.E-06	- -	9.E-07	3.E-06
			Chromium (Hexavalent)	1.E-05	- -	3.E-05	4.E-05
			Bismuth-214	3.E-07	- -	2.E-06	2.E-06
			Lead-214	3.E-07	- -	2.E-06	2.E-06
			Chemical Total	2.E-05	--	3.E-05	5.E-05
	Exposure Medium Total						5.E-05
Sediment Total							3.E-04
Surface Water	Paradise Creek Surface Water	Paradise Creek	Chromium (Hexavalent)	4.E-07	- -	2.E-06	2.E-06
			Chemical Total	4.E-07	--	2.E-06	2.E-06
	Exposure Medium Total						2.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Dioxin-Like PCBs	5.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	4.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	1.E-08	- -	3.E-06	3.E-06
			Radium-226	1.E-05	- -	2.E-10	1.E-05
			Chemical Total	3.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							1.E-04

TABLE 10.13

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Subsistence Fisherman
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	2.E-05	- -	- -	2.E-05
			High Risk PCBs	2.E-03	- -	- -	2.E-03
			Chromium (Hexavalent)	1.E-05	- -	- -	1.E-05
			Dioxin-like PCBs	3.E-04	- -	- -	3.E-04
			2,3,7,8-TCDD TEQ	9.E-03	- -	- -	9.E-03
			Bismuth-214	9.E-04	- -	- -	9.E-04
			Lead-214	1.E-03	- -	- -	1.E-03
			Strontium-90	2.E-05	- -	- -	2.E-05
			Chemical Total	1.E-02	--	--	1.E-02
	Exposure Medium Total						1.E-02
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	5.E-05	- -	- -	5.E-05
			4,4'-DDD	4.E-06	- -	- -	4.E-06
			4,4'-DDE	2.E-05	- -	- -	2.E-05
			Heptachlor epoxide	4.E-05	- -	- -	4.E-05
			High Risk PCBs	5.E-04	- -	- -	5.E-04
			Aroclor 1254	2.E-04	- -	- -	2.E-04
			Chromium (Hexavalent)	4.E-04	- -	- -	4.E-04
			Dioxin-like PCBs	1.E-03	- -	- -	1.E-03
			2,3,7,8-TCDD TEQ	3.E-04	- -	- -	3.E-04
			Bismuth-214	1.E-03	- -	- -	1.E-03
			Lead-214	5.E-04	- -	- -	5.E-04
			Strontium-90	3.E-05	- -	- -	3.E-05
			Chemical Total	4.E-03	--	--	4.E-03
	Exposure Medium Total						4.E-03
Tissue Ingestion Total							2.E-02

2.E-02

TABLE 10.14
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS
REASONABLE MAXIMUM EXPOSURE
Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	Aroclor 1248	3.E-05	- -	1.E-05	4.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	2.E-05	- -	7.E-06	3.E-05	Aroclor 1254	Eyes, nails, immune system	6	- -	2	8
			Aroclor 1260	1.E-05	- -	3.E-06	1.E-05	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	3.E-04	- -	9.E-05	4.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Arsenic	2.E-06	- -	3.E-07	3.E-06	Arsenic	Skin/Vascular		Not a risk driver		0.00
			Chromium (Hexavalent)	2.E-06	- -	2.E-06	5.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.03	1
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.9	- -	0.02	0.9
			Dioxin-like PCBs	2.E-05	- -	8.E-06	3.E-05	Dioxin-like PCBs	Development	3	- -	1	4
			2,3,7,8-TCDD TEQ	7.E-06	- -	5.E-07	8.E-06	2,3,7,8-TCDD TEQ	Development	0.9	- -	0.06	1
			Bismuth-214	6.E-05	- -	2.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	8.E-05	- -	1.E-07	8.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-214	7.E-05	- -	2.E-04	3.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	5.E-05	6.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	6.E-04	- -	6.E-04	1.E-03	Chemical Total	- -	12	- -	3	16
	Exposure Medium Total						1.E-03						16
Soil	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	2.E-06	- -	2.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	2.E-06	--	2.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						2.E-06						0.00
Soil Total							1.E-03						16
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Chromium (Hexavalent)	7.E-06	- -	1.E-05	2.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	2.E-06	- -	2.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Chemical Total	9.E-06	--	1.E-05	2.E-05	Chemical Total		0.5	--	0.03	0.6
	Exposure Medium Total						2.E-05						0.6
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Chromium (Hexavalent)	3.E-06	- -	4.E-06	6.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Chemical Total	3.E-06	--	4.E-06	6.E-06	Chemical Total		0.000	--	0.000	0.000
	Exposure Medium Total						6.E-06						0.000
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-05	- -	6.E-05	1.E-04	Chromium (Hexavalent)	None Reported		Not a risk driver		0.0
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Chemical Total	4.E-05	--	6.E-05	1.E-04	Chemical Total		0.3	--	0.0	0.3
	Exposure Medium Total						1.E-04						0.3

TABLE 10.14

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	6.E-06	- -	8.E-06	1.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	8	- -	0.3	8
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			Chemical Total	6.E-06	--	8.E-06	1.E-05	Chemical Total		8	--	0.3	9
	Exposure Medium Total						1.E-05						9
Sediment Total							1.E-04						9
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Chromium (Hexavalent)	1.E-06	- -	4.E-06	5.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			2,3,7,8-TCDD TEQ	7.E-08	- -	7.E-06	7.E-06	2,3,7,8-TCDD TEQ	Development	0.009	- -	1	1
			Chemical Total	1.E-06	--	1.E-05	1.E-05	Chemical Total		0.01	--	1	1
	Exposure Medium Total						1.E-05						1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-05	- -	4.E-05	5.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Dioxin-Like PCBs	2.E-08	- -	5.E-06	5.E-06	Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			Radium-226	2.E-06	- -	2.E-11	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	1.E-05	--	5.E-05	6.E-05	Chemical Total		0.3	--	0.6	1
	Exposure Medium Total						6.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 27

Total Eyes HI =	8
Total Immune System HI =	8
Total Nails HI =	8
Total Thyroid HI =	10
Total Hair HI =	2
Total Development HI =	7

TABLE 10.15

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Site Soil	Site Soil	Aroclor 1248	7.E-06	- -	2.E-05	3.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	1.E-05	2.E-05	Aroclor 1254	Eyes, nails, immune system	0.9	- -	3	3
			Aroclor 1260	2.E-06	- -	6.E-06	8.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05	- -	2.E-04	2.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Chromium (Hexavalent)	2.E-07	- -	2.E-06	2.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.2	- -	0.03	0.2
			Dioxin-like PCBs	5.E-06	- -	1.E-05	2.E-05	Dioxin-like PCBs	Development	0.4	- -	1	2
			2,3,7,8-TCDD TEQ	1.E-06	- -	9.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	0.1	- -	0.1	0.2
			Bismuth-214	5.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	6.E-05	- -	2.E-07	6.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-214	5.E-05	- -	4.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	1.E-05	- -	7.E-05	8.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	1.E-03	1.E-03	Chemical Total	- -	2	- -	4	5
	Exposure Medium Total						1.E-03						5
Soil	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	3.E-06	- -	3.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	3.E-06	--	3.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						3.E-06						0.00
Soil Total							1.E-03						5
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Chromium (Hexavalent)	7.E-07	- -	8.E-06	9.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Chemical Total	7.E-07	--	8.E-06	9.E-06	Chemical Total	--	0.00	--	0.00	0.0
	Exposure Medium Total						9.E-06						0.0
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Chromium (Hexavalent)	2.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			Chemical Total	2.E-07	--	3.E-06	3.E-06	Chemical Total	--	0.000	--	0.00	0.00
	Exposure Medium Total						3.E-06						0.00
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	4.E-06	- -	5.E-05	5.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Chemical Total	4.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.00	--	0.0	0.0
	Exposure Medium Total						5.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	6.E-07	- -	7.E-06	7.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	1	- -	0.3	1
			Chemical Total	6.E-07	--	7.E-06	7.E-06	Chemical Total	--	1	--	0.3	1
	Exposure Medium Total						7.E-06						1
Sediment Total							7.E-05						1

TABLE 10.15

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Chromium (Hexavalent)	2.E-07	- -	4.E-06	4.E-06	Chromium (Hexavalent)	None Reported	Not a risk driver			0.000
			2,3,7,8-TCDD TEQ	3.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	0.002	- -	1	1
			Chemical Total	2.E-07	--	2.E-05	2.E-05	Chemical Total	--	0.00	--	1	1
	Exposure Medium Total						2.E-05						1
Surface Water	Estuarine Wetland Surface Water	Estuarine Wetland	Chromium (Hexavalent)	2.E-06	- -	4.E-05	4.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.0
			Dioxin-Like PCBs	8.E-09	- -	9.E-06	9.E-06	Dioxin-Like PCBs	Development	0.001	- -	0.8	0.8
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-06	--	5.E-05	5.E-05	Chemical Total	--	0.001	--	0.8	1
	Exposure Medium Total						5.E-05						1
Surface Water Total							7.E-05						2

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 9

Total Eyes HI =	3
Total Immune System HI =	3
Total Nails HI =	3
Total Thyroid HI =	2
Total Development HI =	4

TABLE 10.16

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Aroclor 1248	1.E-05	- -	6.E-06	2.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	7.E-06	- -	4.E-06	1.E-05	Aroclor 1254	Eyes, nails, immune system		Not a risk driver		0.0
			Aroclor 1260	3.E-06	- -	2.E-06	5.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	9.E-05	- -	5.E-05	1.E-04	High Risk PCB Congeners	NA	NV	- -	NV	NV
			Dioxin-like PCBs	7.E-06	- -	4.E-06	1.E-05	Dioxin-like PCBs	Development		Not a risk driver		0
			2,3,7,8-TCDD TEQ	2.E-06	- -	3.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development		Not a risk driver		0.0
			Bismuth-214	1.E-04	- -	7.E-04	8.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	1.E-04	- -	5.E-07	1.E-04	Lead-210	NA	NV	- -	NV	NV
			Lead-214	1.E-04	- -	8.E-04	9.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	2.E-05	- -	2.E-04	2.E-04	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	5.E-04	- -	2.E-03	2.E-03	Chemical Total	- -	0	- -	0	0
	Exposure Medium Total						2.E-03						0
	Air	Volatile and Fugitive Dust Emissions											
			High Risk PCB Congeners	- -	6.E-06	- -	6.E-06	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Chemical Total	--	6.E-06	--	6.E-06	Chemical Total		--	0.00	--	0.00
	Exposure Medium Total						6.E-06						0.00
Soil Total							2.E-03						0
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Chromium (Hexavalent)	4.E-07	- -	3.E-06	3.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Chemical Total	4.E-07	--	3.E-06	3.E-06	Chemical Total		0.00	--	0.00	0.00
	Exposure Medium Total						3.E-06						0.00
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Radium-226	3.E-07	- -	2.E-06	2.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-07	--	2.E-06	2.E-06	Chemical Total		0.000	--	0.000	0.000
	Exposure Medium Total						2.E-06						0.000
Sediment	Paradise Creek Sediment	Paradise Creek	Chromium (Hexavalent)	2.E-06	- -	2.E-05	2.E-05	Chromium (Hexavalent)	None Reported		Not a risk driver		0.00
			Chemical Total	2.E-06	--	2.E-05	2.E-05	Chemical Total		0.00	--	0.00	0.0
	Exposure Medium Total						2.E-05						0.0
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Chromium (Hexavalent)	3.E-07	- -	2.E-06	3.E-06	Chromium (Hexavalent)	None Reported		Not a risk driver		0.000
			Chemical Total	3.E-07	--	2.E-06	3.E-06	Chemical Total		0.0	--	0.0	0
	Exposure Medium Total						3.E-06						0
Sediment Total							3.E-05						0

TABLE 10.16

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Trespasser/Visitor
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	4.E-08	- -	1.E-05	1.E-05	2,3,7,8-TCDD TEQ	Development	Not a risk driver			0.0
			Radium-226	3.E-06	- -	4.E-11	3.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	3.E-06	--	1.E-05	1.E-05	Chemical Total		0.00	--	0.0	0.0
	Exposure Medium Total						1.E-05						0.0
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-06	- -	1.E-05	1.E-05	Chromium (Hexavalent)	None Reported	Not a risk driver			0.00
			Dioxin-Like PCBs	1.E-08	- -	8.E-06	8.E-06	Dioxin-Like PCBs	Development	Not a risk driver			0.0
			Radium-226	7.E-06	- -	8.E-11	7.E-06	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	8.E-06	--	2.E-05	3.E-05	Chemical Total		0.00	--	0.0	0.0
	Exposure Medium Total						3.E-05						0.0
Surface Water Total							4.E-05						0.0

Total Risk Across All Media: 2.E-03

Total Hazard Index Across All Media: 0

TABLE 10.17

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Aroclor 1248	7.E-06	- -	3.E-06	1.E-05	Aroclor 1248	NA	NV	- -	NV	NV
			Aroclor 1254	5.E-06	- -	2.E-06	7.E-06	Aroclor 1254	Eyes, nails, immune system	8	- -	4	12
			Aroclor 1260	2.E-06	- -	1.E-06	3.E-06	Aroclor 1260	NA	NV	- -	NV	NV
			High Risk PCB Congeners	6.E-05		3.E-05	9.E-05	High Risk PCB Congeners	NA	NV		NV	NV
			Aluminum	NV	- -	NV	NV	Aluminum	Neurological	0.09	- -	0.03	0.1
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Manganese	NV	- -	NV	NV	Manganese	Neurological	0.05	- -	0.04	0.10
			Dioxin-like PCBs	5.E-06	- -	2.E-06	7.E-06	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	2.E-06	- -	1.E-07	2.E-06	2,3,7,8-TCDD TEQ	Development	1	- -	0	1
			Bismuth-214	3.E-05	- -	3.E-04	3.E-04	Bismuth-214	NA	NV	- -	NV	NV
			Lead-210	4.E-05	- -	2.E-07	4.E-05	Lead-210	NA	NV	- -	NV	NV
			Lead-214	3.E-05	- -	3.E-04	4.E-04	Lead-214	NA	NV	- -	NV	NV
			Radium-226	7.E-06	- -	7.E-05	7.E-05	Radium-226	NA	NV	- -	NV	NV
			Chemical Total	2.E-04	- -	7.E-04	9.E-04	Chemical Total	- -	15	- -	6	21
	Exposure Medium Total						9.E-04						21
	Air	Fugitive Dust Emissions											
			Aroclor 1248	- -	2.E-06	- -	2.E-06	Aroclor 1248	NA	- -	NV	- -	NV
			High Risk PCB Congeners	- -	2.E-05	- -	2.E-05	High Risk PCB Congeners	NA	- -	NV	- -	NV
			Aluminum	- -	NV	- -	NV	Aluminum	Neurological	- -	0.3	- -	0.3
			Cobalt		Not a risk driver		0.E+00	Cobalt	Respiratory System	- -	1	- -	1
			Manganese	- -	NV	- -	NV	Manganese	Neurological	- -	0.5	- -	0.5
			Nickel		Not a risk driver		0.E+00	Nickel	Respiratory System	- -	0.3	- -	0.3
			Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	6	- -	6
			Bismuth-214	- -	6.E-06	- -	6.E-06	Bismuth-214	NA	- -	NV	- -	NV
			Lead-210	- -	8.E-06	- -	8.E-06	Lead-210	NA	- -	NV	- -	NV
			Lead-214	- -	7.E-06	- -	7.E-06	Lead-214	NA	- -	NV	- -	NV
			Radium-226	- -	2.E-06	- -	2.E-06	Radium-226	NA	- -	NV	- -	NV
			Chemical Total	--	5.E-05	--	5.E-05	Chemical Total	--	--	9	--	9
	Exposure Medium Total						5.E-05						9
Soil Total							1.E-03						29

TABLE 10.17

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future
Receptor Population: Construction Worker (One-Year Construction Project)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV			Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22
Groundwater Total							0.E+00						22

Total Risk Across All Media: 1.E-03

Total Hazard Index Across All Media: 51

Total Neurological HI =	7
Total Eyes HI =	12
Total Immune System HI =	12
Total Nails HI =	12
Total Thyroid HI =	23
Total Development HI =	7
Total Respiratory System HI =	2

TABLE 10.18

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth, Virginia

Scenario Timeframe: Future

Receptor Population: Construction Worker (90-Day Dock Construction Project)

Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Paradise Creek Sediment	Paradise Creek	Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.8	- -	0.03	0.9
			Chemical Total	0.E+00	- -	0.E+00	0.E+00	Chemical Total	- -	0.8	- -	0.03	0.9
	Exposure Medium Total						0.E+00						0.9
Sediment	Paradise Creek Sediment	Volatile and Fugitive Dust Emissions	Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	- -	0.E+00	- -	0.E+00	Chemical Total	- -	- -	0.2	- -	0.2
	Exposure Medium Total						0.E+00						0.2
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	21	- -	0.7	22
			Chemical Total	0.E+00	- -	0.E+00	0.E+00	Chemical Total	- -	21	- -	1	22
	Exposure Medium Total						0.E+00						22
Sediment	Air	Volatile and Fugitive Dust Emissions	Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	3	- -	3
			Chemical Total	- -	0.E+00	- -	0.E+00	Chemical Total	- -	- -	3	- -	3
	Exposure Medium Total						0.E+00						3
Sediment Total							0.E+00						26

Total Risk Across All Media: 0.E+00

Total Hazard Index Across All Media: 26

Total Neurological HI = 3

Total Thyroid HI = 23

TABLE 10.19

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil											
			Aroclor 1254	Not a risk driver			0.E+00	Aroclor 1254	Eyes, nails, immune system	9	- -	4	12
			Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	2	- -	0.05	2
			Thallium	NV	- -	NV	NV	Thallium	Hair	1	- -	0.04	1
			Dioxin-like PCBs	Not a risk driver			0.E+00	Dioxin-like PCBs	Development	4	- -	2	6
			2,3,7,8-TCDD TEQ	Not a risk driver			0.E+00	2,3,7,8-TCDD TEQ	Development	1	- -	0.1	1
			Chemical Total	0.E+00	- -	0.E+00	0.E+00	Chemical Total	- -	17	- -	6	23
	Exposure Medium Total						0.E+00						23
	Air	Volatile and Fugitive Dust Emissions	Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	0.4	- -	0.4
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total		--	0.4	--	0.4
	Exposure Medium Total						0.E+00						0.4
Soil Total							0.E+00						23
Groundwater	Air Inside an Open Excavation	Inhalation	Cyanide		NV		NV	Cyanide	Thyroid	- -	22	- -	22
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total	--	--	22	--	22
	Exposure Medium Total						0.E+00						22
Groundwater	Groundwater	Utility Trench	2,3,7,8-TCDD TEQ	- -	- -		0.E+00	2,3,7,8-TCDD TEQ	Development	- -	- -	1	1
			Chemical Total	--	--	0.E+00	0.E+00	Chemical Total		--	--	1	1
	Exposure Medium Total						0.E+00						1
Groundwater Total							0.E+00						23
Sediment	Northern Drainage Channel Sediment	Northern Drainage Channel	Thallium	NV	- -	NV	NV	Thallium	Hair	0.4	- -	0.01	0.4
			2,3,7,8-TCDD TEQ				0.E+00	2,3,7,8-TCDD TEQ	Development	0.3	- -	0.03	0.3
			Chemical Total	0.E+00	--	0.E+00	0.E+00	Chemical Total		0.7	--	0.04	1
	Exposure Medium Total						0.E+00						1
Sediment	Paradise Creek Sediment	Paradise Creek	Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	0.4	- -	0.01	0.4
			Chemical Total	0.E+00	--	0.E+00	0.E+00	Chemical Total		0.4	--	0.01	0.4
	Exposure Medium Total						0.E+00						0.4
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	NV	- -	NV	NV	Cobalt	Thyroid	11	- -	0.3	11
			Thallium	NV	- -	NV	NV	Thallium	Hair	0.5	- -	0.02	0.5
			Chemical Total	0.E+00	--	0.E+00	0.E+00	Chemical Total		11	--	0.4	12
	Exposure Medium Total						0.E+00						12
Sediment	Estuarine Wetland Sediment	Volatile and Fugitive Dust Emissions	Mercury	- -	NV	- -	NV	Mercury	Neurological	- -	1	- -	1
			Chemical Total	--	0.E+00	--	0.E+00	Chemical Total		--	1	--	1
	Exposure Medium Total						0.E+00						1
Sediment Total							0.E+00						14

TABLE 10.19

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Utility Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total		Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	Not a risk driver			0.E+00	2,3,7,8-TCDD TEQ	Development	0.001	- -	1	1
			Chemical Total	0.E+00	--	0.E+00	0.E+00	Chemical Total		0.00	--	1	1
	Exposure Medium Total						0.E+00						1
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Dioxin-Like PCBs	Not a risk driver			0.E+00	Dioxin-Like PCBs	Development	0.0004	- -	1	1
			Chemical Total	0.E+00	--	0.E+00	0.E+00	Chemical Total		0.0	--	1	1
	Exposure Medium Total						0.E+00						1
Surface Water Total							0.E+00						3

Total Risk Across All Media: 0.E+00

Total Hazard Index Across All Media: 62

Total Neurological HI =	1
Total Eyes HI =	12
Total Immune System HI =	12
Total Nails HI =	12
Total Thyroid HI =	35
Total Hair HI =	2
Total Development HI =	11

TABLE 10.20

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	Aroclor 1254	Eyes, nails, immune system	37	- -	12	49
			Aluminum	Neurological	0.4	- -	0.010	0.4
			Antimony	Blood and longevity	0.9	- -	0.1	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.04	2
			Iron	Gastrointestinal Tract	1	- -	0.03	1
			Manganese	Neurological	0.2	- -	0.1	0.4
			Thallium	Hair	5	- -	0.1	5
			Vanadium	Hair	0.3	- -	0.2	0.5
			Zinc	Blood and immune system	0.2	- -	0.005	0.2
			Mercury	Autoimmune effects	0.2	- -	0.066	0.3
			Dioxin-like PCBs	Development	18	- -	6	24
			2,3,7,8-TCDD TEQ	Development	5	- -	0.4	6
			Chemical Total	- -	78	- -	20	98
	Exposure Medium Total							98
	Air	Volatile and Fugitive Dust Emissions	Mercury	Neurological	- -	2	- -	2
			Chemical Total	--	--	2	--	2
	Exposure Medium Total							2
Soil Total								99
			Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Thallium	Hair	52	- -	0.2	53
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Chemical Total	--	68	--	6	74
	Exposure Medium Total							74
		Indoor Air (Vapor Intrusion)	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	--	--	0.2	--	0.2
	Exposure Medium Total							0.2
Groundwater Total								74
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.02	0.2
			Chemical Total	--	0.5	--	0.03	0.6
	Exposure Medium Total							0.6
Sediment	Paradise Creek Sediment	Paradise Creek	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Chemical Total	--	0.3	--	0.01	0.3
	Exposure Medium Total							0.3
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	8	- -	0.3	8
			Thallium	Hair	0.4	- -	0.01	0.4
			Chemical Total	--	8	--	0.3	9
	Exposure Medium Total							9
Sediment Total								9

TABLE 10.20

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Chemical Total	--	0.009	--	0.9	0.9
	Exposure Medium Total							0.9
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			Chemical Total	--	0.3	--	0.6	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Chemical Total	--	101	--	--	101
	Exposure Medium Total							101
Shellfish Tissue	Shellfish Tissue	Ingestion	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Chemical Total	--	10	--	--	10
	Exposure Medium Total							10
Tissue Ingestion Total								111

Total Hazard Index Across All Media	296

Total Neurological HI =	4
Total Blood HI =	4
Total Skin/Vascular HI =	3
Total Eyes HI =	52
Total Immune System HI =	52
Total Nails HI =	52
Total Longevity HI =	3
Total Gastrointestinal Tract HI =	5
Total Thyroid HI =	25
Total Hair HI =	59
Total Development HI =	145

TABLE 10.21

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil	Aroclor 1254	Eyes, nails, immune system	3	- -	2	6
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Thallium	Hair	0.5	- -	0.02	0.5
			Dioxin-like PCBs	Development	2	- -	1	3
			2,3,7,8-TCDD TEQ	Development	0.5	- -	0.1	0.6
			Chemical Total	- -	7	- -	3	10
	Exposure Medium Total							10
	Air	Volatile and Fugitive Dust Emissions	Mercury	Neurological	- -	2	- -	2
			Chemical Total		--	2	--	2
	Exposure Medium Total							2
Soil Total								12
Groundwater	Groundwater	Potable Water Use	Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Cobalt	Thyroid	5	- -	0.011	5
			Manganese	Neurological	0.5	- -	0.07	0.6
			Thallium	Hair	31	- -	0.2	32
			Dioxin-Like PCBs	Development	0.005	- -	0.2	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Chemical Total	- -	40	--	4	44
	Exposure Medium Total							44
Groundwater	Air	Inhalation while Showering	Cyanide	Thyroid	- -	0.6	- -	0.6
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	--	--	0.2	--	0.2
	Exposure Medium Total							0.2
Groundwater Total								45
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Chemical Total		0.7	--	0.1	1
	Exposure Medium Total							1
Sediment Total								1
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Chemical Total		0.00	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			Chemical Total		0.00	--	0.3	0.3
	Exposure Medium Total							0.3
Surface Water Total								0.7

TABLE 10.21

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Manganese	Neurological	0.2	- -	- -	0.2
			Chemical Total		59	--	--	59
	Exposure Medium Total							59
Shellfish Tissue	Shellfish Tissue	Ingestion	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Chemical Total		9	--	--	9
	Exposure Medium Total							9
Tissue Ingestion Total								68

	126

Total Neurological HI =	3
Total Blood HI =	2
Total Skin/Vascular HI =	1
Total Eyes HI =	7
Total Immune System HI =	7
Total Nails HI =	7
Total Longevity HI =	2
Total Thyroid HI =	7
Total Hair HI =	32
Total Development HI =	73

TABLE 10.21

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Soil	Soil	Site Soil					
			Benzo(a)pyrene	6.E-06	- -	2.E-06	7.E-06
			Dibenzo(a,h)anthracene	1.E-06	- -	5.E-07	2.E-06
			Aroclor 1248	3.E-04	- -	1.E-04	4.E-04
			Aroclor 1254	2.E-04	- -	7.E-05	2.E-04
			Aroclor 1260	8.E-05	- -	3.E-05	1.E-04
			High Risk PCB Congeners	2.E-03	- -	8.E-04	3.E-03
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Chromium (Hexavalent)	2.E-05	- -	2.E-05	3.E-05
			Dioxin-like PCBs	2.E-04	- -	7.E-05	3.E-04
			2,3,7,8-TCDD TEQ	5.E-05	- -	5.E-06	6.E-05
			Bismuth-214	9.E-04	- -	1.E-02	1.E-02
			Lead-210	1.E-03	- -	8.E-06	1.E-03
			Lead-214	1.E-03	- -	1.E-02	1.E-02
			Radium-226	2.E-04	- -	2.E-03	3.E-03
			Chemical Total	6.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02
	Air	Volatile and Fugitive Dust Emissions					
			Aroclor 1248	- -	3.E-05	- -	3.E-05
			Aroclor 1254	- -	1.E-05	- -	1.E-05
			Aroclor 1260	- -	4.E-06	- -	4.E-06
			High Risk PCB Congeners	- -	3.E-04	- -	3.E-04
			Dioxin-like PCBs	- -	6.E-06	- -	6.E-06
			2,3,7,8-TCDD TEQ	- -	2.E-06	- -	2.E-06
			Lead-210	- -	2.E-06	- -	2.E-06
			Chemical Total	--	3.E-04	--	3.E-04
	Exposure Medium Total						3.E-04
Soil Total							3.E-02
Groundwater	Groundwater	Potable Water Use	Arsenic	3.E-04	- -	1.E-06	3.E-04
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Radium-226	- -	2.E-01	- -	2.E-01
			Chemical Total	- -	0.E+00	- -	2.E-01
	Exposure Medium Total						2.E-01
Groundwater	Air	Indoor Air (Vapor Intrusion)	Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01

TABLE 10.21

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Chemical Total	4.E-06	--	9.E-06	1.E-05
	Exposure Medium Total						1.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Chemical Total	9.E-06	--	4.E-05	5.E-05
	Exposure Medium Total						5.E-05
Sediment Total							4.E-04
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Surface Water	Paradise Creek Surface Water	Paradise Creek	Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Chemical Total	3.E-07	--	1.E-06	2.E-06
	Exposure Medium Total						2.E-06
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04

TABLE 10.21

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Chromium (Hexavalent)	3.E-06	- -	- -	3.E-06
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Lead-214	2.E-04	- -	- -	2.E-04
			Strontium-90	4.E-06	- -	- -	4.E-06
			Chemical Total	3.E-03	--	--	3.E-03
	Exposure Medium Total						3.E-03
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	7.E-06	- -	- -	7.E-06
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Chromium (Hexavalent)	5.E-05	- -	- -	5.E-05
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Lead-214	6.E-05	- -	- -	6.E-05
			Strontium-90	3.E-06	- -	- -	3.E-06
			Chemical Total	6.E-04	--	--	6.E-04
	Exposure Medium Total						6.E-04
Tissue Ingestion Total							4.E-03

3.E-01

TABLE 10.23

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil	Aroclor 1254	Eyes, nails, immune system	2	- -	0.5	2
			Aluminum	Neurological	1	- -	0.03	1
			Antimony	Blood and longevity	1	- -	0.2	1
			Arsenic	Skin/Vascular	0.4	- -	0.04	0.4
			Cobalt	Thyroid	7	- -	0.2	7
			Copper	Gastrointestinal Tract	2	- -	0.05	2
			Iron	Gastrointestinal Tract	3	- -	0.07	3
			Manganese	Neurological	0.4	- -	0.2	0.6
			Thallium	Hair	13	- -	0.3	13
			Vanadium	Hair	0.7	- -	0.6	1
			Zinc	Blood and immune system	0.3	- -	0.008	0.3
			Mercury	Autoimmune effects	0.3	- -	0.1	0.4
			Dioxin-like PCBs	Development	4	- -	1	6
			2,3,7,8-TCDD TEQ	Development	9	- -	1	10
			Chemical Total	- -	45	- -	4	49
	Exposure Medium Total							49
	Air	Volatile and Fugitive Dust Emissions	Mercury	Neurological	- -	3	- -	3
			Chemical Total		--	3	--	3
	Exposure Medium Total							3
Soil Total								52

TABLE 10.23

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Groundwater	Potable Water Use	Antimony	Blood, Longevity	2	- -	0.07	2
			Arsenic	Skin, Vascular	2	- -	0.01	2
			Cobalt	Thyroid	8	- -	0.01	8
			Iron	Gastrointestinal Tract	1	- -	0.005	1
			Manganese	Neurological	0.8	- -	0.09	0.9
			Thallium	Hair	52	- -	0.2	53
			Dioxin-Like PCBs	Development	0.008	- -	0.4	0.4
			2,3,7,8-TCDD TEQ	Development	0.3	- -	6	6
			Chemical Total	--	68	--	6	74
	Exposure Medium Total							74
Groundwater	Air	Indoor Air (Vapor Intrusion)	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	--	--	0.2	--	0.2
	Exposure Medium Total							0.2
Groundwater Total								74
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Thallium	Hair	0.3	- -	0.01	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	0.0	0.2
			Chemical Total	--	0.5	--	0.03	0.6
	Exposure Medium Total							0.6
Sediment	Paradise Creek Sediment	Paradise Creek	Cobalt	Thyroid	0.3	- -	0.01	0.3
			Chemical Total	--	0.3	--	0.01	0.3
	Exposure Medium Total							0.3
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	8	- -	0.3	8
			Thallium	Hair	0.4	- -	0.01	0.4
			Chemical Total	--	8	--	0.3	9
	Exposure Medium Total							9
Sediment Total								9
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	Development	0.009	- -	0.9	0.9
			Chemical Total	--	0.009	--	0.9	0.9
	Exposure Medium Total							0.9

TABLE 10.23

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Cobalt	Thyroid	0.3	- -	0.006	0.3
			Dioxin-Like PCBs	Development	0.002	- -	0.6	0.6
			Chemical Total	--	0.3	--	0.6	1
	Exposure Medium Total							1
Surface Water Total								2
Fish Tissue	Fish Tissue	Ingestion	Iron	Gastrointestinal Tract	0.4	- -	- -	0.4
			Manganese	Neurological	0.4	- -	- -	0.4
			Dioxin-like PCBs	Development	3	--	--	3
			2,3,7,8-TCDD TEQ	Development	97	--	--	97
			Chemical Total	--	101	--	--	101
	Exposure Medium Total							101
Shellfish Tissue	Shellfish Tissue	Ingestion	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Cobalt	Thyroid	0.6	- -	- -	0.6
			Mercury	Development, Neurological	0.3	- -	- -	0.3
			Dioxin-like PCBs	Development	5	- -	- -	5
			2,3,7,8-TCDD TEQ	Development	2	- -	- -	2
			Chemical Total	--	10	--	--	10
	Exposure Medium Total							10
Tissue Ingestion Total								111

Total Hazard Index Across All Media	248

Total Neurological HI =	6
Total Blood HI =	4
Total Skin/Vascular HI =	3
Total Eyes HI =	4
Total Immune System HI =	5
Total Nails HI =	4
Total Longevity HI =	4
Total Gastrointestinal Tract HI =	7
Total Thyroid HI =	25
Total Hair HI =	68
Total Development HI =	131

TABLE 10.24

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil	Aroclor 1254	Eyes, nails, immune system	0.1	- -	0.09	0.2
			Cobalt	Thyroid	0.7	- -	0.03	0.7
			Copper	Gastrointestinal Tract	0.2	- -	0.008	0.2
			Iron	Gastrointestinal Tract	0.3	- -	0.01	0.3
			Thallium	Hair	1	- -	0.05	1
			Vanadium	Hair	0.06	- -	0.1	0.2
			Dioxin-like PCBs	Development	0.4	- -	0.2	0.6
			2,3,7,8-TCDD TEQ	Development	0.9	- -	0.1	1
			Chemical Total	- -	4	- -	1	4
	Exposure Medium Total							4
	Air	Volatile and Fugitive Dust Emissions	Mercury	Neurological	- -	3	- -	3
			Chemical Total	--	--	3	--	3
	Exposure Medium Total							3
Soil Total								7
Groundwater	Groundwater	Potable Water Use	Antimony	Blood, Longevity	1	- -	0.05	2
			Arsenic	Skin, Vascular	1	- -	0.008	1
			Cobalt	Thyroid	5	- -	0.011	5
			Iron	Gastrointestinal Tract	0.7	- -	0.004	0.8
			Manganese	Neurological	0.5	- -	0.07	0.6
			Thallium	Hair	31	- -	0.2	32
			Dioxin-Like PCBs	Development	0.005	- -	0.2	0.3
			2,3,7,8-TCDD TEQ	Development	0.2	- -	4	4
			Chemical Total	- -	41	--	4	45
	Exposure Medium Total							45
Groundwater	Air	Inhalation while Showering	Cyanide	Thyroid	- -	0.6	- -	0.6
			Chemical Total	- -	- -	0.6	- -	0.6
	Exposure Medium Total							0.6
Groundwater	Air	Indoor Air (Vapor Intrusion)	Mercury	Neurological	- -	0.2	- -	0.2
			Chemical Total	--	--	0.2	--	0.2
	Exposure Medium Total							0.2
Groundwater Total								46
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Cobalt	Thyroid	0.7	- -	0.1	0.9
			Chemical Total		0.7	--	0.1	0.9
	Exposure Medium Total							0.9
Sediment Total								0.9
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	2,3,7,8-TCDD TEQ	Development	0.002	- -	0.4	0.4
			Chemical Total		0.00	--	0.4	0.4
	Exposure Medium Total							0.4
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Dioxin-Like PCBs	Development	0.0005	- -	0.3	0.3
			Chemical Total		0.00	--	0.3	0.3
	Exposure Medium Total							0.3
Surface Water Total								0.7

TABLE 10.24

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Fish Tissue	Fish Tissue	Ingestion	Iron	Gastrointestinal Tract	0.2	- -	- -	0.2
			Manganese	Neurological	0.2	- -	- -	0.2
			Dioxin-like PCBs	Development	2			2
			2,3,7,8-TCDD TEQ	Development	57			57
			Chemical Total		59	--	--	59
	Exposure Medium Total							59
Shellfish Tissue	Shellfish Tissue	Ingestion	Aroclor 1254	Eyes, Nails, Immune System	2	- -	- -	2
			Cobalt	Thyroid	0.5	- -	- -	0.5
			Mercury	Development, Neurological	0.2	- -	- -	0.2
			Dioxin-like PCBs	Development	4			4
			2,3,7,8-TCDD TEQ	Development	1			1
			Chemical Total		8	--	--	8
	Exposure Medium Total							8
Tissue Ingestion Total								67

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Total Neurological HI =	4
Total Blood HI =	2
Total Skin/Vascular HI =	1
Total Eyes HI =	2
Total Immune System HI =	2
Total Nails HI =	2
Total Longevity HI =	2
Total Gastrointestinal Tract HI =	1
Total Thyroid HI =	7
Total Hair HI =	33
Total Development HI =	71

TABLE 10.25

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Current Surface Soil	Surface Soil	Surface Soil	Benzo(a)anthracene	1.E-06	- -	4.E-07	2.E-06
			Benzo(a)pyrene	1.E-05	- -	4.E-06	2.E-05
			Benzo(b)fluoranthene	1.E-06	- -	5.E-07	2.E-06
			Dibenzo(a,h)anthracene	3.E-06	- -	1.E-06	5.E-06
			Aroclor 1248	1.E-05	- -	5.E-06	2.E-05
			Aroclor 1254	7.E-06	- -	3.E-06	1.E-05
			Aroclor 1260	2.E-05	- -	7.E-06	2.E-05
			High Risk PCB Congeners	3.E-05	- -	1.E-05	5.E-05
			Arsenic	2.E-05	- -	3.E-06	2.E-05
			Chromium (Hexavalent)	6.E-05	- -	6.E-05	1.E-04
			Dioxin-like PCBs	4.E-05	- -	2.E-05	6.E-05
			2,3,7,8-TCDD TEQ	1.E-04	- -	8.E-06	1.E-04
			Bismuth-214	1.E-03	- -	1.E-02	1.E-02
			Lead-210	2.E-03	- -	1.E-05	2.E-03
			Lead-214	1.E-03	- -	2.E-02	2.E-02
			Radium-226	1.E-05	- -	2.E-04	2.E-04
			Chemical Total	5.E-03	- -	3.E-02	3.E-02
	Exposure Medium Total						3.E-02
	Air	Volatile and Fugitive Dust Emissions	High Risk PCB Congeners	- -	4.E-06	- -	4.E-06
			Dioxin-like PCBs	- -	2.E-06	- -	2.E-06
			2,3,7,8-TCDD TEQ	- -	3.E-06	- -	3.E-06
			Lead-210	- -	3.E-06	- -	3.E-06
			Lead-214	- -	2.E-06	- -	2.E-06
			Chemical Total	--	1.E-05	--	1.E-05
	Exposure Medium Total						1.E-05
Soil Total							3.E-02
			Arsenic	3.E-04	- -	1.E-06	3.E-04
			Chromium (Hexavalent)	2.E-04	- -	1.E-04	3.E-04
			Vinyl chloride	2.E-04	- -	1.E-05	2.E-04
			Dioxin-Like PCBs	2.E-07	- -	9.E-06	1.E-05
			High Risk PCBs	1.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	8.E-06	- -	1.E-04	1.E-04
			Bismuth-214	5.E-04	- -	1.E-10	5.E-04
			Lead-210	2.E-03	- -	4.E-13	2.E-03
			Lead-214	4.E-04	- -	9.E-11	4.E-04
			Radium-226	6.E-03	- -	1.E-09	6.E-03
			Strontium-90	2.E-06	- -	4.E-14	2.E-06
			Chemical Total	9.E-03	--	3.E-04	1.E-02
	Exposure Medium Total						1.E-02
Groundwater	Air	Inhalation while Showering	Radium-226	- -	2.E-01	- -	2.E-01
			Chemical Total	- -	2.E-01	- -	2.E-01
	Exposure Medium Total						2.E-01

TABLE 10.25

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Groundwater	Air	Indoor Air (Vapor Intrusion)	Vinyl chloride	- -	9.E-06	- -	9.E-06
			Chemical Total	- -	9.E-06	- -	9.E-06
	Exposure Medium Total						9.E-06
Groundwater Total							2.E-01
Sediment	Norther Drainage Channel Sediment	Northern Drainage Channel	Benzo(a)pyrene	1.E-06	- -	6.E-07	2.E-06
			Arsenic	2.E-06	- -	6.E-07	2.E-06
			Chromium (Hexavalent)	8.E-06	- -	2.E-05	2.E-05
			2,3,7,8-TCDD TEQ	2.E-06	- -	5.E-07	3.E-06
			Chemical Total	1.E-05	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Sediment	Freshwater Wetland Sediment	Freshwater Wetland	Chromium (Hexavalent)	3.E-06	- -	6.E-06	9.E-06
			Lead-214	3.E-07	- -	1.E-06	2.E-06
			Radium-226	5.E-07	- -	2.E-06	3.E-06
			Chemical Total	4.E-06	--	9.E-06	1.E-05
	Exposure Medium Total						1.E-05
Sediment	Paradise Creek Sediment	Paradise Creek	Arsenic	8.E-07	- -	1.E-06	2.E-06
			Chromium (Hexavalent)	4.E-05	- -	3.E-04	3.E-04
			Dioxin-like PCBs	8.E-07	- -	3.E-06	4.E-06
			Chemical Total	5.E-05	--	3.E-04	3.E-04
	Exposure Medium Total						3.E-04
Sediment	Estuarine Wetland Sediment	Estuarine Wetland	Dibenzo(a,h)anthracene	1.E-06	- -	2.E-06	3.E-06
			Aroclor 1248	7.E-07	- -	3.E-06	3.E-06
			Arsenic	1.E-06	- -	2.E-06	3.E-06
			Chromium (Hexavalent)	6.E-06	- -	4.E-05	4.E-05
			Chemical Total	9.E-06	--	4.E-05	5.E-05
	Exposure Medium Total						5.E-05
Sediment Total							4.E-04
Surface Water	Northern Drainage Channel Surface Water	Northern Drainage Channel	Chromium (Hexavalent)	1.E-06	- -	7.E-06	8.E-06
			2,3,7,8-TCDD TEQ	1.E-07	- -	2.E-05	2.E-05
			Radium-226	4.E-06	- -	5.E-11	4.E-06
			Chemical Total	6.E-06	--	2.E-05	3.E-05
	Exposure Medium Total						3.E-05
Surface Water	Paradise Creek Surface Water	Paradise Creek	Chromium (Hexavalent)	3.E-07	- -	1.E-06	2.E-06
			Chemical Total	3.E-07	--	1.E-06	2.E-06
	Exposure Medium Total						2.E-06

TABLE 10.25

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR SITE-RELATED COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Future
Receptor Population: Resident (Surface Soil Only)
Receptor Age: Child/Adult, Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Surface Water	Estuarine Wetland Paradise Creek	Estuarine Wetland	Chromium (Hexavalent)	1.E-05	- -	7.E-05	8.E-05
			Dioxin-Like PCBs	3.E-08	- -	3.E-05	3.E-05
			High Risk PCBs	2.E-08	- -	5.E-06	5.E-06
			2,3,7,8-TCDD TEQ	8.E-09	- -	3.E-06	3.E-06
			Radium-226	9.E-06	- -	1.E-10	9.E-06
			Chemical Total	2.E-05	--	1.E-04	1.E-04
	Exposure Medium Total						1.E-04
Surface Water Total							2.E-04
Fish Tissue	Fish Tissue	Ingestion	Chlordane	6.E-06	- -	- -	6.E-06
			High Risk PCBs	4.E-04	- -	- -	4.E-04
			Chromium (Hexavalent)	8.E-06	- -	- -	8.E-06
			Dioxin-like PCBs	8.E-05	- -	- -	8.E-05
			2,3,7,8-TCDD TEQ	2.E-03	- -	- -	2.E-03
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Lead-214	2.E-04	- -	- -	2.E-04
			Strontium-90	4.E-06	- -	- -	4.E-06
			Chemical Total	3.E-03	--	--	3.E-03
	Exposure Medium Total						3.E-03
Shellfish Tissue	Shellfish Tissue	Ingestion	Aldrin	7.E-06	- -	- -	7.E-06
			4,4'-DDE	2.E-06	- -	- -	2.E-06
			Heptachlor epoxide	6.E-06	- -	- -	6.E-06
			High Risk PCBs	6.E-05	- -	- -	6.E-05
			Aroclor 1254	3.E-05	- -	- -	3.E-05
			Chromium (Hexavalent)	2.E-04	- -	- -	2.E-04
			Dioxin-like PCBs	2.E-04	- -	- -	2.E-04
			2,3,7,8-TCDD TEQ	4.E-05	- -	- -	4.E-05
			Bismuth-214	2.E-04	- -	- -	2.E-04
			Lead-214	6.E-05	- -	- -	6.E-05
			Strontium-90	3.E-06	- -	- -	3.E-06
			Chemical Total	7.E-04	--	--	7.E-04
	Exposure Medium Total						7.E-04
Tissue Ingestion Total							4.E-03

3.E-01

TABLE 10.26

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR RISK DRIVERS

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Non-Carcinogenic Hazard Quotient				
				Primary Target Organ	Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Cobalt	Thyroid	4	- -	0.09	4
			Chemical Total	- -	4	- -	0.09	4
	Exposure Medium Total							4
Sediment Total								4

Total Hazard Index Across All Media, Complete Dataset: 4

Total Thyroid HI = 4

TABLE 10.27

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Peck Iron and Metal Superfund Site, Portsmouth Virginia

Scenario Timeframe: Current
Receptor Population: Resident (Cradock Community)
Receptor Age: Age-Adjusted

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal/External Exposure	Exposure Routes Total
Sediment	Sediment	Cradock Community Sediment	Arsenic	2.E-05	- -	3.E-06	2.E-05
			Bismuth-214	3.E-06	- -	4.E-05	4.E-05
			Lead-214	4.E-06	- -	5.E-05	5.E-05
			Chemical Total	3.E-05	- -	9.E-05	1.E-04
	Exposure Medium Total						1.E-04
	Air	Volatile and Fugitive Dust Emissions	Chromium (Hexavalent)	- -	0.E+00	- -	0.E+00
Sediment Total							1.E-04

Total Risk Across All Media, Complete Dataset: 1.E-04

ATTACHMENT B

RADIONUCLIDE PRGS

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Site-Specific

Resident Equation Inputs for Soil - Secular Equilibrium

Variable	Value
TR (target cancer risk) unitless	1.0E-6
t_{res} (time - resident) yr	26
ED_{res} (exposure duration - resident) yr	26
ET_{res} (exposure time - resident) hr/day	24
ET_{res-c} (exposure time - resident child) hr/day	24
ET_{res-a} (exposure time - resident adult) hr/day	24
ET_{res-i} (exposure time - indoor resident) hr/day	16.416
ET_{res-o} (exposure time - outdoor resident) hr/day	1.752
ED_{res-c} (exposure duration - resident child) yr	6
ED_{res-a} (exposure duration - resident adult) yr	20
EF_{res} (exposure frequency - resident) day/yr	350
EF_{res-c} (exposure frequency - resident child) day/yr	350
EF_{res-a} (exposure frequency - resident adult) day/yr	350
IRS_{res-a} (soil intake rate - resident adult) mg/day	100
IRS_{res-c} (soil intake rate - resident child) mg/day	200
IRA_{res-a} (inhalation rate - resident adult) m^3/day	20
IRA_{res-c} (inhalation rate - resident child) m^3/day	10
$IFS_{res-adj}$ (age-adjusted soil ingestion factor - resident) mg	1120000
$IFA_{res-adj}$ (age-adjusted soil inhalation factor - resident) m^3	161000
GSF_i (gamma shielding factor - indoor) unitless	0.4
Site area for ACF (area correction factor) m^2	200005
Cover thickness for GSF_o (gamma shielding factor) cm	0
Cover thickness for GSF_h (gamma shielding factor) cm	0
$IRAP_{res-a}$ (apple ingestion rate - resident adult) g/day	73.7
$IRAP_{res-c}$ (apple ingestion rate - resident child) g/day	72.2
$IFAP_{res-adj}$ (age-adjusted apple ingestion factor) g	667520
$IRCI_{res-a}$ (citrus ingestion rate - resident adult) g/day	309.4
$IRCI_{res-c}$ (citrus ingestion rate - resident child) g/day	194.1
$IFCI_{res-adj}$ (age-adjusted citrus ingestion factor) g	2573410
$IRBE_{res-a}$ (berry ingestion rate - resident adult) g/day	35.4
$IRBE_{res-c}$ (berry ingestion rate - resident child) g/day	23.9
$IFBE_{res-adj}$ (age-adjusted berry ingestion factor) g	297990
$IRPC_{res-a}$ (peach ingestion rate - resident adult) g/day	115.7
$IRPC_{res-c}$ (peach ingestion rate - resident child) g/day	111.4

Output generated 01DEC2017:11:42:22

Site-Specific

Resident Equation Inputs for Soil - Secular Equilibrium

Variable	Value
$IFPC_{res\text{-}adj}$ (age-adjusted peach ingestion factor) g	1043840
$IRPR_{res\text{-}a}$ (pear ingestion rate - resident adult) g/day	51.9
$IRPR_{res\text{-}c}$ (pear ingestion rate - resident child) g/day	66.7
$IFPR_{res\text{-}adj}$ (age-adjusted pear ingestion factor) g	503370
$IRST_{res\text{-}a}$ (strawberry ingestion rate - resident adult) g/day	40.5
$IRST_{res\text{-}c}$ (strawberry ingestion rate - resident child) g/day	25.3
$IFST_{res\text{-}adj}$ (age-adjusted strawberry ingestion factor) g	336630
$IRAS_{res\text{-}a}$ (asparagus ingestion rate - resident adult) g/day	39.3
$IRAS_{res\text{-}c}$ (asparagus ingestion rate - resident child) g/day	12.0
$IFAS_{res\text{-}adj}$ (age-adjusted asparagus ingestion factor) g	300300
$IRBT_{res\text{-}a}$ (beet ingestion rate - resident adult) g/day	33.9
$IRBT_{res\text{-}c}$ (beet ingestion rate - resident child) g/day	3.9
$IFBT_{res\text{-}adj}$ (age-adjusted beet ingestion factor) g	245490
$IRBR_{res\text{-}a}$ (broccoli ingestion rate - resident adult) g/day	32.0
$IRBR_{res\text{-}c}$ (broccoli ingestion rate - resident child) g/day	13.1
$IFBR_{res\text{-}adj}$ (age-adjusted broccoli ingestion factor) g	251510
$IRCB_{res\text{-}a}$ (cabbage ingestion rate - resident adult) g/day	92.1
$IRCB_{res\text{-}c}$ (cabbage ingestion rate - resident child) g/day	12.3
$IFCB_{res\text{-}adj}$ (age-adjusted cabbage ingestion factor) g	670530
$IRCR_{res\text{-}a}$ (carrot ingestion rate - resident adult) g/day	27.3
$IRCR_{res\text{-}c}$ (carrot ingestion rate - resident child) g/day	14.9
$IFCR_{res\text{-}adj}$ (age-adjusted carrot ingestion factor) g	222390
$IRCO_{res\text{-}a}$ (corn ingestion rate - resident adult) g/day	59.8
$IRCO_{res\text{-}c}$ (corn ingestion rate - resident child) g/day	23.8
$IFCO_{res\text{-}adj}$ (age-adjusted corn ingestion factor) g	468580
$IRCU_{res\text{-}a}$ (cucumber ingestion rate - resident adult) g/day	82.4
$IRCU_{res\text{-}c}$ (cucumber ingestion rate - resident child) g/day	25.4
$IFCU_{res\text{-}adj}$ (age-adjusted cucumber ingestion factor) g	630140
$IRLE_{res\text{-}a}$ (lettuce ingestion rate - resident adult) g/day	37.5
$IRLE_{res\text{-}c}$ (lettuce ingestion rate - resident child) g/day	4.2
$IFLE_{res\text{-}adj}$ (age-adjusted lettuce ingestion factor) g	271320
$IRLI_{res\text{-}a}$ (lima bean ingestion rate - resident adult) g/day	33.8
$IRLI_{res\text{-}c}$ (lima bean ingestion rate - resident child) g/day	6.5
$IFLI_{res\text{-}adj}$ (age-adjusted lima bean ingestion factor) g	250250

Output generated 01DEC2017:11:42:22

Site-Specific

Resident Equation Inputs for Soil - Secular Equilibrium

Variable	Value
$IROK_{res-a}$ (okra ingestion rate - resident adult) g/day	30.2
$IROK_{res-c}$ (okra ingestion rate - resident child) g/day	5.3
$IFOK_{res-adj}$ (age-adjusted okra ingestion factor) g	222530
$IRON_{res-a}$ (onion ingestion rate - resident adult) g/day	21.8
$IRON_{res-c}$ (onion ingestion rate - resident child) g/day	5.8
$IFON_{res-adj}$ (age-adjusted onion ingestion factor) g	164780
$IRPE_{res-a}$ (pea ingestion rate - resident adult) g/day	35.4
$IRPE_{res-c}$ (pea ingestion rate - resident child) g/day	32.1
$IFPE_{res-adj}$ (age-adjusted pea ingestion factor) g	315210
$IRPU_{res-a}$ (pumpkin ingestion rate - resident adult) g/day	64.8
$IRPU_{res-c}$ (pumpkin ingestion rate - resident child) g/day	45.2
$IFPU_{res-adj}$ (age-adjusted pumpkin ingestion factor) g	548520
$IRSN_{res-a}$ (snap bean ingestion rate - resident adult) g/day	53.9
$IRSN_{res-c}$ (snap bean ingestion rate - resident child) g/day	27.3
$IFSN_{res-adj}$ (age-adjusted snap bean ingestion factor) g	434630
$IRTO_{res-a}$ (tomato ingestion rate - resident adult) g/day	80.3
$IRTO_{res-c}$ (tomato ingestion rate - resident child) g/day	29.7
$IFTO_{res-adj}$ (age-adjusted tomato ingestion factor) g	624470
$IRPT_{res-a}$ (potato ingestion rate - resident adult) g/day	127.8
$IRPT_{res-c}$ (potato ingestion rate - resident child) g/day	51.7
$IFPT_{res-adj}$ (age-adjusted potato ingestion factor) g	1003170
$IRRI_{res-a}$ (rice ingestion rate - resident adult) g/day	73.2
$IRRI_{res-c}$ (rice ingestion rate - resident child) g/day	28.8
$IFRI_{res-adj}$ (age-adjusted rice ingestion factor) g	572880
$IRCG_{res-a}$ (cereal grain ingestion rate - resident adult) g/day	76.0
$IRCG_{res-c}$ (cereal grain ingestion rate - resident child) g/day	38.0
$IFCG_{res-adj}$ (age-adjusted cereal grain ingestion factor) g	611800
$CF_{res-produce}$ (contaminated plant fraction) unitless	1
$CF_{res-apple}$ (contaminated apple fraction) unitless	1
$CF_{res-citrus}$ (contaminated citrus fraction) unitless	1
$CF_{res-berry}$ (contaminated berry fraction) unitless	1
$CF_{res-peach}$ (contaminated peach fraction) unitless	1
$CF_{res-pear}$ (contaminated pear fraction) unitless	1
$CF_{res-strawberry}$ (contaminated strawberry fraction) unitless	1

Site-Specific

Resident Equation Inputs for Soil - Secular Equilibrium

Variable	Value
$CF_{res\text{-}asparagus}$ (contaminated asparagus fraction) unitless	1
$CF_{res\text{-}beet}$ (contaminated beet fraction) unitless	1
$CF_{res\text{-}broccoli}$ (contaminated broccoli fraction) unitless	1
$CF_{res\text{-}cabbage}$ (contaminated cabbage fraction) unitless	1
$CF_{res\text{-}carrot}$ (contaminated carrot fraction) unitless	1
$CF_{res\text{-}corn}$ (contaminated corn fraction) unitless	1
$CF_{res\text{-}cucumber}$ (contaminated cucumber fraction) unitless	1
$CF_{res\text{-}lettuce}$ (contaminated lettuce fraction) unitless	1
$CF_{res\text{-}lima\ bean}$ (contaminated lima bean fraction) unitless	1
$CF_{res\text{-}okra}$ (contaminated okra fraction) unitless	1
$CF_{res\text{-}onion}$ (contaminated onion fraction) unitless	1
$CF_{res\text{-}pea}$ (contaminated pea fraction) unitless	1
$CF_{res\text{-}pumpkin}$ (contaminated pumpkin fraction) unitless	1
$CF_{res\text{-}snap\ bean}$ (contaminated snap bean fraction) unitless	1
$CF_{res\text{-}tomato}$ (contaminated tomato fraction) unitless	1
$CF_{res\text{-}potato}$ (contaminated potato fraction) unitless	1
$CF_{res\text{-}rice}$ (contaminated rice fraction) unitless	1
$CF_{res\text{-}cereal\ grain}$ (contaminated cereal grain fraction) unitless	1
MLF_{apple} (apple mass loading factor) unitless	.000160
MLF_{citrus} (citrus mass loading factor) unitless	.000157
MLF_{berry} (berry mass loading factor) unitless	.000166
MLF_{peach} (peach mass loading factor) unitless	.000150
MLF_{pear} (pear mass loading factor) unitless	.000160
$MLF_{strawberry}$ (strawberry mass loading factor) unitless	.0000800
$MLF_{asparagus}$ (asparagus mass loading factor) unitless	.0000790
MLF_{beet} (beet mass loading factor) unitless	.000138
$MLF_{broccoli}$ (broccoli mass loading factor) unitless	.00101
$MLF_{cabbage}$ (cabbage mass loading factor) unitless	.000105
MLF_{carrot} (carrot mass loading factor) unitless	.0000970
MLF_{corn} (corn mass loading factor) unitless	.000145
$MLF_{cucumber}$ (cucumber mass loading factor) unitless	.0000400
$MLF_{lettuce}$ (lettuce mass loading factor) unitless	.0135
$MLF_{lima\ bean}$ (lima bean mass loading factor) unitless	.00383
MLF_{okra} (okra mass loading factor) unitless	.0000800

Site-Specific

Resident Equation Inputs for Soil - Secular Equilibrium

Variable	Value
MLF_{onion} (onion mass loading factor) unitless	.0000970
MLF_{pea} (pea mass loading factor) unitless	.000178
$MLF_{pumpkin}$ (pumpkin mass loading factor) unitless	.0000580
$MLF_{snap\ bean}$ (snap bean mass loading factor) unitless	.00500
MLF_{tomato} (tomato mass loading factor) unitless	.00159
MLF_{potato} (potato mass loading factor) unitless	.000210
MLF_{rice} (rice mass loading factor) unitless	.250
$MLF_{cereal\ grain}$ (cereal grain mass loading factor) unitless	.250
TR (target cancer risk) unitless	1.0E-6
ED_{res-c} (exposure duration - resident child) yr	6
ED_{res-a} (exposure duration - resident adult) yr	20
EF_{res-c} (exposure frequency - resident child) day/yr	350
EF_{res-a} (exposure frequency - resident adult) day/yr	350
City (Climate Zone)	29
A_c (acres)	30.48
Q/C_{wp} (g/m^2-s per kg/m^3)	48.350218387664
PEF (particulate emission factor) m^3/kg	700886117.84995
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.194

Site-Specific
Resident PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=1.0E-6 (pCi/g)	Inhalation PRG TR=1.0E-6 (pCi/g)	External Exposure PRG TR=1.0E-6 (pCi/g)	Produce Consumption PRG TR=1.0E-6 (pCi/g)	Total PRG TR=1.0E-6 (pCi/g)
**Secular Equilibrium PRG for Be-7*	*4.54E+03*	*2.02E+07*	*5.39E-01*	-	***5.39E-01***
**Secular Equilibrium PRG for Bi-212*	*5.32E+02*	*3.85E+04*	*1.76E-02*	-	***1.76E-02***
**Secular Equilibrium PRG for Bi-214*	*1.78E-01*	*1.41E+02*	*1.67E-02*	-	***1.53E-02***
**Secular Equilibrium PRG for Cs-137*	*2.10E+01*	*3.87E+04*	*4.71E-02*	-	***4.70E-02***
**Secular Equilibrium PRG for K-40*	*1.53E+01*	*1.96E+04*	*1.58E-01*	-	***1.57E-01***
**Secular Equilibrium PRG for Pa-234m*	*1.49E-01*	*3.60E+01*	*1.44E-02*	-	***1.31E-02***
**Secular Equilibrium PRG for Pb-210*	*1.78E-01*	*1.41E+02*	*2.70E+01*	-	***1.77E-01***
**Secular Equilibrium PRG for Pb-212*	*1.37E+01*	*5.87E+03*	*1.64E-02*	-	***1.64E-02***
**Secular Equilibrium PRG for Pb-214*	*1.78E-01*	*1.41E+02*	*1.46E-02*	-	***1.35E-02***
**Secular Equilibrium PRG for Ra-226*	*1.57E-01*	*7.36E+01*	*1.46E-02*	-	***1.33E-02***
**Secular Equilibrium PRG for Ra-228*	*3.29E-01*	*2.31E+01*	*1.06E-02*	-	***1.02E-02***
**Secular Equilibrium PRG for Sr-90*	*6.59E+00*	*1.00E+04*	*5.94E+00*	-	***3.13E+00***
**Secular Equilibrium PRG for Th-234*	*1.47E-01*	*3.60E+01*	*1.44E-02*	-	***1.31E-02***
**Secular Equilibrium PRG for Tl-208*	-	-	*6.83E-03*	-	***6.83E-03***
**Secular Equilibrium PRG for U-235*	*6.08E-01*	*1.38E+01*	*5.03E-02*	-	***4.63E-02***

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IRAP_{res-a}$ (apple ingestion rate - resident adult) g/day	73.7
$IRAP_{res-c}$ (apple ingestion rate - resident child) g/day	72.2
$IFAP_{res-adj}$ (age-adjusted apple ingestion factor) g	667520
$IRCI_{res-a}$ (citrus ingestion rate - resident adult) g/day	309.4
$IRCI_{res-c}$ (citrus ingestion rate - resident child) g/day	194.1
$IFCI_{res-adj}$ (age-adjusted citrus ingestion factor) g	2573410
$IRBE_{res-a}$ (berry ingestion rate - resident adult) g/day	35.4
$IRBE_{res-c}$ (berry ingestion rate - resident child) g/day	23.9
$IFBE_{res-adj}$ (age-adjusted berry ingestion factor) g	297990
$IRPC_{res-a}$ (peach ingestion rate - resident adult) g/day	115.7
$IRPC_{res-c}$ (peach ingestion rate - resident child) g/day	111.4
$IFPC_{res-adj}$ (age-adjusted peach ingestion factor) g	1043840
$IRPR_{res-a}$ (pear ingestion rate - resident adult) g/day	51.9
$IRPR_{res-c}$ (pear ingestion rate - resident child) g/day	66.7
$IFPR_{res-adj}$ (age-adjusted pear ingestion factor) g	503370
$IRST_{res-a}$ (strawberry ingestion rate - resident adult) g/day	40.5
$IRST_{res-c}$ (strawberry ingestion rate - resident child) g/day	25.3
$IFST_{res-adj}$ (age-adjusted strawberry ingestion factor) g	336630
$IRAS_{res-a}$ (asparagus ingestion rate - resident adult) g/day	39.3
$IRAS_{res-c}$ (asparagus ingestion rate - resident child) g/day	12.0
$IFAS_{res-adj}$ (age-adjusted asparagus ingestion factor) g	300300
$IRBT_{res-a}$ (beet ingestion rate - resident adult) g/day	33.9
$IRBT_{res-c}$ (beet ingestion rate - resident child) g/day	3.9
$IFBT_{res-adj}$ (age-adjusted beet ingestion factor) g	245490
$IRBR_{res-a}$ (broccoli ingestion rate - resident adult) g/day	32.0
$IRBR_{res-c}$ (broccoli ingestion rate - resident child) g/day	13.1
$IFBR_{res-adj}$ (age-adjusted broccoli ingestion factor) g	251510
$IRCB_{res-a}$ (cabbage ingestion rate - resident adult) g/day	92.1
$IRCB_{res-c}$ (cabbage ingestion rate - resident child) g/day	12.3
$IFCB_{res-adj}$ (age-adjusted cabbage ingestion factor) g	670530
$IRCR_{res-a}$ (carrot ingestion rate - resident adult) g/day	27.3
$IRCR_{res-c}$ (carrot ingestion rate - resident child) g/day	14.9
$IFCR_{res-adj}$ (age-adjusted carrot ingestion factor) g	222390
$IRCO_{res-a}$ (corn ingestion rate - resident adult) g/day	59.8

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IRCO_{res-c}$ (corn ingestion rate - resident child) g/day	23.8
$IFCO_{res-ardi}$ (age-adjusted corn ingestion factor) g	468580
$IRCU_{res-a}$ (cucumber ingestion rate - resident adult) g/day	82.4
$IRCU_{res-c}$ (cucumber ingestion rate - resident child) g/day	25.4
$IFCU_{res-ardi}$ (age-adjusted cucumber ingestion factor) g	630140
$IRLE_{res-a}$ (lettuce ingestion rate - resident adult) g/day	37.5
$IRLE_{res-c}$ (lettuce ingestion rate - resident child) g/day	4.2
$IFLE_{res-ardi}$ (age-adjusted lettuce ingestion factor) g	271320
$IRLI_{res-a}$ (lima bean ingestion rate - resident adult) g/day	33.8
$IRLI_{res-c}$ (lima bean ingestion rate - resident child) g/day	6.5
$IFLI_{res-ardi}$ (age-adjusted lima bean ingestion factor) g	250250
$IROK_{res-a}$ (okra ingestion rate - resident adult) g/day	30.2
$IROK_{res-c}$ (okra ingestion rate - resident child) g/day	5.3
$IFOK_{res-ardi}$ (age-adjusted okra ingestion factor) g	222530
$IRON_{res-a}$ (onion ingestion rate - resident adult) g/day	21.8
$IRON_{res-c}$ (onion ingestion rate - resident child) g/day	5.8
$IFON_{res-ardi}$ (age-adjusted onion ingestion factor) g	164780
$IRPE_{res-a}$ (pea ingestion rate - resident adult) g/day	35.4
$IRPE_{res-c}$ (pea ingestion rate - resident child) g/day	32.1
$IFPE_{res-ardi}$ (age-adjusted pea ingestion factor) g	315210
$IRPU_{res-a}$ (pumpkin ingestion rate - resident adult) g/day	64.8
$IRPU_{res-c}$ (pumpkin ingestion rate - resident child) g/day	45.2
$IFPU_{res-ardi}$ (age-adjusted pumpkin ingestion factor) g	548520
$IRSN_{res-a}$ (snap bean ingestion rate - resident adult) g/day	53.9
$IRSN_{res-c}$ (snap bean ingestion rate - resident child) g/day	27.3
$IFSN_{res-ardi}$ (age-adjusted snap bean ingestion factor) g	434630
$IRTO_{res-a}$ (tomato ingestion rate - resident adult) g/day	80.3
$IRTO_{res-c}$ (tomato ingestion rate - resident child) g/day	29.7
$IFTO_{res-ardi}$ (age-adjusted tomato ingestion factor) g	624470
$IRPT_{res-a}$ (potato ingestion rate - resident adult) g/day	127.8
$IRPT_{res-c}$ (potato ingestion rate - resident child) g/day	51.7
$IFPT_{res-ardi}$ (age-adjusted potato ingestion factor) g	1003170
$IRRI_{res-a}$ (rice ingestion rate - resident adult) g/day	73.2
$IRRI_{res-c}$ (rice ingestion rate - resident child) g/day	28.8

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IFRI_{res\text{-}adj}$ (age-adjusted rice ingestion factor) g	572880
$IRCG_{res\text{-}a}$ (cereal grain ingestion rate - resident adult) g/day	76.0
$IRCG_{res\text{-}c}$ (cereal grain ingestion rate - resident child) g/day	38.0
$IFCG_{res\text{-}adj}$ (age-adjusted cereal grain ingestion factor) g	611800
$CF_{res\text{-}produce}$ (contaminated plant fraction) unitless	1
$CF_{res\text{-}apple}$ (contaminated apple fraction) unitless	1
$CF_{res\text{-}citrus}$ (contaminated citrus fraction) unitless	1
$CF_{res\text{-}berry}$ (contaminated berry fraction) unitless	1
$CF_{res\text{-}peach}$ (contaminated peach fraction) unitless	1
$CF_{res\text{-}pear}$ (contaminated pear fraction) unitless	1
$CF_{res\text{-}strawberry}$ (contaminated strawberry fraction) unitless	1
$CF_{res\text{-}asparagus}$ (contaminated asparagus fraction) unitless	1
$CF_{res\text{-}beet}$ (contaminated beet fraction) unitless	1
$CF_{res\text{-}broccoli}$ (contaminated broccoli fraction) unitless	1
$CF_{res\text{-}cabbage}$ (contaminated cabbage fraction) unitless	1
$CF_{res\text{-}carrot}$ (contaminated carrot fraction) unitless	1
$CF_{res\text{-}corn}$ (contaminated corn fraction) unitless	1
$CF_{res\text{-}cucumber}$ (contaminated cucumber fraction) unitless	1
$CF_{res\text{-}lettuce}$ (contaminated lettuce fraction) unitless	1
$CF_{res\text{-}lima\ bean}$ (contaminated lima bean fraction) unitless	1
$CF_{res\text{-}okra}$ (contaminated okra fraction) unitless	1
$CF_{res\text{-}onion}$ (contaminated onion fraction) unitless	1
$CF_{res\text{-}pea}$ (contaminated pea fraction) unitless	1
$CF_{res\text{-}pumpkin}$ (contaminated pumpkin fraction) unitless	1
$CF_{res\text{-}snap\ bean}$ (contaminated snap bean fraction) unitless	1
$CF_{res\text{-}tomato}$ (contaminated tomato fraction) unitless	1
$CF_{res\text{-}potato}$ (contaminated potato fraction) unitless	1
$CF_{res\text{-}rice}$ (contaminated rice fraction) unitless	1
$CF_{res\text{-}cereal\ grain}$ (contaminated cereal grain fraction) unitless	1
TR (target cancer risk) unitless	0.00001
$EV_{far\text{-}c}$ (bathing events per day - farmer child) event/day	1
$EV_{far\text{-}a}$ (bathing events per day - farmer adult) event/day	1
$EF_{res\text{-}c}$ (exposure frequency - resident child) day/yr	350
$EF_{res\text{-}a}$ (exposure frequency - resident adult) day/yr	350

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
ED_{res} (exposure duration - resident) yr	26
ET_{res-c} (exposure time - resident child) hr/day	24
ET_{res-a} (exposure time - resident adult) hr/day	24
ED_{res-a} (exposure duration - resident adult) yr	20
ED_{res-c} (exposure duration - resident child) yr	6
IRW_{res-a} (water intake rate - resident adult) L/day	2.5
IRW_{res-c} (water intake rate - resident child) L/day	0.78
K (volatilization factor of Andelman) L/m^3	0.5
IRA_{res-a} (inhalation rate - resident adult) m^3/day	20
IRA_{res-c} (inhalation rate - resident child) m^3/day	10
$IFW_{res-adj}$ (adjusted intake factor - resident) L-yr/kg-day	19138
$IFA_{res-adj}$ (age-adjusted inhalation factor - resident) m^3	161000
$DFA_{res-adj}$ (age-adjusted immersion factor - resident) hr	6104
$ET_{event-res-c}$ (duration of bathing event - child) hr/event	0.54
$ET_{event-res-a}$ (duration of bathing event - adult) hr/event	0.71
F (irrigation period) unitless	0.25
I_f (interception fraction) unitless	0.42
I_r (irrigation rate) L/m^2-day	3.62
$Lambda_{ll}$ (soil leaching rate) 1/day	0.000027
P (area density for root zone) kg/m^2	240
T (translocation factor) unitless	1
t_h (long term deposition and buildup) day	10950
t_v (above ground exposure time) day	60
t_w (weathering half-life) day	14
Y_v (plant yield - wet) kg/m^2	2

Site-Specific

Resident PRGs for Tap Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.00001 (pCi/L)	Inhalation PRG TR=0.00001 (pCi/L)	Immersion PRG TR=0.00001 (pCi/L)	Produce Consumption PRG TR=0.00001 (pCi/L)	Total PRG TR=0.00001 (pCi/L)
**Secular Equilibrium PRG for Be-7*	*5.98E+03*	-	*3.18E+07*	-	***5.98E+03***
**Secular Equilibrium PRG for Bi-212*	*7.28E+02*	-	*1.07E+06*	-	***7.27E+02***
**Secular Equilibrium PRG for Bi-214*	*1.96E-01*	-	*9.90E+05*	-	***1.96E-01***
**Secular Equilibrium PRG for Cs-137*	*1.71E+01*	-	*2.78E+06*	-	***1.71E+01***
**Secular Equilibrium PRG for K-40*	*2.12E+01*	-	*9.17E+06*	-	***2.12E+01***
**Secular Equilibrium PRG for Pa-234m*	*1.62E-01*	*4.41E-03*	*8.44E+05*	-	***4.29E-03***
**Secular Equilibrium PRG for Pb-210*	*1.96E-01*	-	*8.44E+08*	-	***1.96E-01***
**Secular Equilibrium PRG for Pb-212*	*2.02E+01*	-	*9.80E+05*	-	***2.02E+01***
**Secular Equilibrium PRG for Pb-214*	*1.96E-01*	-	*8.58E+05*	-	***1.96E-01***
**Secular Equilibrium PRG for Ra-226*	*1.71E-01*	*4.41E-03*	*8.54E+05*	-	***4.30E-03***
**Secular Equilibrium PRG for Ra-228*	*3.90E-01*	*1.10E-02*	*6.27E+05*	-	***1.07E-02***
**Secular Equilibrium PRG for Sr-90*	*7.07E+00*	-	*3.61E+08*	-	***7.07E+00***
**Secular Equilibrium PRG for Th-234*	*1.61E-01*	*4.41E-03*	*8.41E+05*	-	***4.29E-03***
**Secular Equilibrium PRG for Tl-208*	-	-	*4.15E+05*	-	***4.15E+05***
**Secular Equilibrium PRG for U-235*	*7.14E-01*	-	*2.59E+06*	-	***7.14E-01***

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IRAP_{res-a}$ (apple ingestion rate - resident adult) g/day	73.7
$IRAP_{res-c}$ (apple ingestion rate - resident child) g/day	72.2
$IFAP_{res-adj}$ (age-adjusted apple ingestion factor) g	667520
$IRCI_{res-a}$ (citrus ingestion rate - resident adult) g/day	309.4
$IRCI_{res-c}$ (citrus ingestion rate - resident child) g/day	194.1
$IFCI_{res-adj}$ (age-adjusted citrus ingestion factor) g	2573410
$IRBE_{res-a}$ (berry ingestion rate - resident adult) g/day	35.4
$IRBE_{res-c}$ (berry ingestion rate - resident child) g/day	23.9
$IFBE_{res-adj}$ (age-adjusted berry ingestion factor) g	297990
$IRPC_{res-a}$ (peach ingestion rate - resident adult) g/day	115.7
$IRPC_{res-c}$ (peach ingestion rate - resident child) g/day	111.4
$IFPC_{res-adj}$ (age-adjusted peach ingestion factor) g	1043840
$IRPR_{res-a}$ (pear ingestion rate - resident adult) g/day	51.9
$IRPR_{res-c}$ (pear ingestion rate - resident child) g/day	66.7
$IFPR_{res-adj}$ (age-adjusted pear ingestion factor) g	503370
$IRST_{res-a}$ (strawberry ingestion rate - resident adult) g/day	40.5
$IRST_{res-c}$ (strawberry ingestion rate - resident child) g/day	25.3
$IFST_{res-adj}$ (age-adjusted strawberry ingestion factor) g	336630
$IRAS_{res-a}$ (asparagus ingestion rate - resident adult) g/day	39.3
$IRAS_{res-c}$ (asparagus ingestion rate - resident child) g/day	12.0
$IFAS_{res-adj}$ (age-adjusted asparagus ingestion factor) g	300300
$IRBT_{res-a}$ (beet ingestion rate - resident adult) g/day	33.9
$IRBT_{res-c}$ (beet ingestion rate - resident child) g/day	3.9
$IFBT_{res-adj}$ (age-adjusted beet ingestion factor) g	245490
$IRBR_{res-a}$ (broccoli ingestion rate - resident adult) g/day	32.0
$IRBR_{res-c}$ (broccoli ingestion rate - resident child) g/day	13.1
$IFBR_{res-adj}$ (age-adjusted broccoli ingestion factor) g	251510
$IRCB_{res-a}$ (cabbage ingestion rate - resident adult) g/day	92.1
$IRCB_{res-c}$ (cabbage ingestion rate - resident child) g/day	12.3
$IFCB_{res-adj}$ (age-adjusted cabbage ingestion factor) g	670530
$IRCR_{res-a}$ (carrot ingestion rate - resident adult) g/day	27.3
$IRCR_{res-c}$ (carrot ingestion rate - resident child) g/day	14.9
$IFCR_{res-adj}$ (age-adjusted carrot ingestion factor) g	222390
$IRCO_{res-a}$ (corn ingestion rate - resident adult) g/day	59.8

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Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IRCO_{res-c}$ (corn ingestion rate - resident child) g/day	23.8
$IFCO_{res-adj}$ (age-adjusted corn ingestion factor) g	468580
$IRCU_{res-a}$ (cucumber ingestion rate - resident adult) g/day	82.4
$IRCU_{res-c}$ (cucumber ingestion rate - resident child) g/day	25.4
$IFCU_{res-adj}$ (age-adjusted cucumber ingestion factor) g	630140
$IRLE_{res-a}$ (lettuce ingestion rate - resident adult) g/day	37.5
$IRLE_{res-c}$ (lettuce ingestion rate - resident child) g/day	4.2
$IFLE_{res-adj}$ (age-adjusted lettuce ingestion factor) g	271320
$IRLI_{res-a}$ (lima bean ingestion rate - resident adult) g/day	33.8
$IRLI_{res-c}$ (lima bean ingestion rate - resident child) g/day	6.5
$IFLI_{res-adj}$ (age-adjusted lima bean ingestion factor) g	250250
$IROK_{res-a}$ (okra ingestion rate - resident adult) g/day	30.2
$IROK_{res-c}$ (okra ingestion rate - resident child) g/day	5.3
$IFOK_{res-adj}$ (age-adjusted okra ingestion factor) g	222530
$IRON_{res-a}$ (onion ingestion rate - resident adult) g/day	21.8
$IRON_{res-c}$ (onion ingestion rate - resident child) g/day	5.8
$IFON_{res-adj}$ (age-adjusted onion ingestion factor) g	164780
$IRPE_{res-a}$ (pea ingestion rate - resident adult) g/day	35.4
$IRPE_{res-c}$ (pea ingestion rate - resident child) g/day	32.1
$IFPE_{res-adj}$ (age-adjusted pea ingestion factor) g	315210
$IRPU_{res-a}$ (pumpkin ingestion rate - resident adult) g/day	64.8
$IRPU_{res-c}$ (pumpkin ingestion rate - resident child) g/day	45.2
$IFPU_{res-adj}$ (age-adjusted pumpkin ingestion factor) g	548520
$IRSN_{res-a}$ (snap bean ingestion rate - resident adult) g/day	53.9
$IRSN_{res-c}$ (snap bean ingestion rate - resident child) g/day	27.3
$IFSN_{res-adj}$ (age-adjusted snap bean ingestion factor) g	434630
$IRTO_{res-a}$ (tomato ingestion rate - resident adult) g/day	80.3
$IRTO_{res-c}$ (tomato ingestion rate - resident child) g/day	29.7
$IFTO_{res-adj}$ (age-adjusted tomato ingestion factor) g	624470
$IRPT_{res-a}$ (potato ingestion rate - resident adult) g/day	127.8
$IRPT_{res-c}$ (potato ingestion rate - resident child) g/day	51.7
$IFPT_{res-adj}$ (age-adjusted potato ingestion factor) g	1003170
$IRRI_{res-a}$ (rice ingestion rate - resident adult) g/day	73.2
$IRRI_{res-c}$ (rice ingestion rate - resident child) g/day	28.8

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
$IFRI_{res\text{-}adj}$ (age-adjusted rice ingestion factor) g	572880
$IRCG_{res\text{-}a}$ (cereal grain ingestion rate - resident adult) g/day	76.0
$IRCG_{res\text{-}c}$ (cereal grain ingestion rate - resident child) g/day	38.0
$IFCG_{res\text{-}adj}$ (age-adjusted cereal grain ingestion factor) g	611800
$CF_{res\text{-}produce}$ (contaminated plant fraction) unitless	1
$CF_{res\text{-}apple}$ (contaminated apple fraction) unitless	1
$CF_{res\text{-}citrus}$ (contaminated citrus fraction) unitless	1
$CF_{res\text{-}berry}$ (contaminated berry fraction) unitless	1
$CF_{res\text{-}peach}$ (contaminated peach fraction) unitless	1
$CF_{res\text{-}pear}$ (contaminated pear fraction) unitless	1
$CF_{res\text{-}strawberry}$ (contaminated strawberry fraction) unitless	1
$CF_{res\text{-}asparagus}$ (contaminated asparagus fraction) unitless	1
$CF_{res\text{-}beet}$ (contaminated beet fraction) unitless	1
$CF_{res\text{-}broccoli}$ (contaminated broccoli fraction) unitless	1
$CF_{res\text{-}cabbage}$ (contaminated cabbage fraction) unitless	1
$CF_{res\text{-}carrot}$ (contaminated carrot fraction) unitless	1
$CF_{res\text{-}corn}$ (contaminated corn fraction) unitless	1
$CF_{res\text{-}cucumber}$ (contaminated cucumber fraction) unitless	1
$CF_{res\text{-}lettuce}$ (contaminated lettuce fraction) unitless	1
$CF_{res\text{-}lima\ bean}$ (contaminated lima bean fraction) unitless	1
$CF_{res\text{-}okra}$ (contaminated okra fraction) unitless	1
$CF_{res\text{-}onion}$ (contaminated onion fraction) unitless	1
$CF_{res\text{-}pea}$ (contaminated pea fraction) unitless	1
$CF_{res\text{-}pumpkin}$ (contaminated pumpkin fraction) unitless	1
$CF_{res\text{-}snap\ bean}$ (contaminated snap bean fraction) unitless	1
$CF_{res\text{-}tomato}$ (contaminated tomato fraction) unitless	1
$CF_{res\text{-}potato}$ (contaminated potato fraction) unitless	1
$CF_{res\text{-}rice}$ (contaminated rice fraction) unitless	1
$CF_{res\text{-}cereal\ grain}$ (contaminated cereal grain fraction) unitless	1
TR (target cancer risk) unitless	1.0E-6
$EV_{far\text{-}c}$ (bathing events per day - farmer child) event/day	1
$EV_{far\text{-}a}$ (bathing events per day - farmer adult) event/day	1
$EF_{res\text{-}c}$ (exposure frequency - resident child) day/yr	350
$EF_{res\text{-}a}$ (exposure frequency - resident adult) day/yr	350

Site-Specific

Resident Equation Inputs for Tap Water - Secular Equilibrium

Variable	Value
ED_{res} (exposure duration - resident) yr	26
ET_{res-c} (exposure time - resident child) hr/day	24
ET_{res-a} (exposure time - resident adult) hr/day	24
ED_{res-a} (exposure duration - resident adult) yr	20
ED_{res-c} (exposure duration - resident child) yr	6
IRW_{res-a} (water intake rate - resident adult) L/day	2.5
IRW_{res-c} (water intake rate - resident child) L/day	0.78
K (volatilization factor of Andelman) L/m^3	0.5
IRA_{res-a} (inhalation rate - resident adult) m^3/day	20
IRA_{res-c} (inhalation rate - resident child) m^3/day	10
$IFW_{res-adj}$ (adjusted intake factor - resident) L-yr/kg-day	19138
$IFA_{res-adj}$ (age-adjusted inhalation factor - resident) m^3	161000
$DFA_{res-adj}$ (age-adjusted immersion factor - resident) hr	6104
$ET_{event-res-c}$ (duration of bathing event - child) hr/event	0.54
$ET_{event-res-a}$ (duration of bathing event - adult) hr/event	0.71
F (irrigation period) unitless	0.25
I_f (interception fraction) unitless	0.42
I_r (irrigation rate) L/m^2-day	3.62
$Lambda_{ss}$ (soil leaching rate) 1/day	0.000027
P (area density for root zone) kg/m^2	240
T (translocation factor) unitless	1
t_h (long term deposition and buildup) day	10950
t_v (above ground exposure time) day	60
t_w (weathering half-life) day	14
Y_v (plant yield - wet) kg/m^2	2

Site-Specific

Resident PRGs for Tap Water - Secular Equilibrium

Isotope	Ingestion PRG TR=1.0E-6 (pCi/L)	Inhalation PRG TR=1.0E-6 (pCi/L)	Immersion PRG TR=1.0E-6 (pCi/L)	Produce Consumption PRG TR=1.0E-6 (pCi/L)	Total PRG TR=1.0E-6 (pCi/L)
**Secular Equilibrium PRG for Be-7*	*5.98E+02*	-	*3.18E+06*	-	***5.98E+02***
**Secular Equilibrium PRG for Bi-212*	*7.28E+01*	-	*1.07E+05*	-	***7.27E+01***
**Secular Equilibrium PRG for Bi-214*	*1.96E-02*	-	*9.90E+04*	-	***1.96E-02***
**Secular Equilibrium PRG for Cs-137*	*1.71E+00*	-	*2.78E+05*	-	***1.71E+00***
**Secular Equilibrium PRG for K-40*	*2.12E+00*	-	*9.17E+05*	-	***2.12E+00***
**Secular Equilibrium PRG for Pa-234m*	*1.62E-02*	*4.41E-04*	*8.44E+04*	-	***4.29E-04***
**Secular Equilibrium PRG for Pb-210*	*1.96E-02*	-	*8.44E+07*	-	***1.96E-02***
**Secular Equilibrium PRG for Pb-212*	*2.02E+00*	-	*9.80E+04*	-	***2.02E+00***
**Secular Equilibrium PRG for Pb-214*	*1.96E-02*	-	*8.58E+04*	-	***1.96E-02***
**Secular Equilibrium PRG for Ra-226*	*1.71E-02*	*4.41E-04*	*8.54E+04*	-	***4.30E-04***
**Secular Equilibrium PRG for Ra-228*	*3.90E-02*	*1.10E-03*	*6.27E+04*	-	***1.07E-03***
**Secular Equilibrium PRG for Sr-90*	*7.07E-01*	-	*3.61E+07*	-	***7.07E-01***
**Secular Equilibrium PRG for Th-234*	*1.61E-02*	*4.41E-04*	*8.41E+04*	-	***4.29E-04***
**Secular Equilibrium PRG for Tl-208*	-	-	*4.15E+04*	-	***4.15E+04***
**Secular Equilibrium PRG for U-235*	*7.14E-02*	-	*2.59E+05*	-	***7.14E-02***

Site-Specific
Resident Risk for Tap Water - Secular Equilibrium

Isotope	Ingestion Risk	Inhalation Risk	Immersion Risk	Produce Consumption Risk	Total Tapwater Risk
**Secular Equilibrium Risk for Be-7*	-	-	-	-	-
**Secular Equilibrium Risk for Bi-212*	-	-	-	-	-
**Secular Equilibrium Risk for Bi-214*	-	-	-	-	-
**Secular Equilibrium Risk for Cs-137*	-	-	-	-	-
**Secular Equilibrium Risk for K-40*	-	-	-	-	-
**Secular Equilibrium Risk for Pa-234m*	-	-	-	-	-
**Secular Equilibrium Risk for Pb-210*	-	-	-	-	-
**Secular Equilibrium Risk for Pb-212*	-	-	-	-	-
**Secular Equilibrium Risk for Pb-214*	-	-	-	-	-
**Secular Equilibrium Risk for Ra-226*	-	-	-	-	-
**Secular Equilibrium Risk for Ra-228*	-	-	-	-	-
**Secular Equilibrium Risk for Sr-90*	-	-	-	-	-
**Secular Equilibrium Risk for Th-234*	-	-	-	-	-
**Secular Equilibrium Risk for Tl-208*	-	-	-	-	-
**Secular Equilibrium Risk for U-235*	-	-	-	-	-
**Total Risk*	-	-	-	-	-

Site-Specific

Resident Equation Inputs for Air - Secular Equilibrium

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{res} (exposure duration - resident) yr	26
t_{res} (time - resident) yr	26
ET_{res} (exposure time - resident) hr/day	24
ET_{res-c} (exposure time - resident child) hr/day	24
ET_{res-a} (exposure time - resident adult) hr/day	24
EF_{res} (exposure frequency) day/yr	350
EF_{res-c} (exposure frequency - resident child) day/yr	350
EF_{res-a} (exposure frequency - resident adult) day/yr	350
ED_{res-c} (exposure duration - resident child) yr	6
ED_{res-a} (exposure duration - resident adult) yr	20
IRA_{res-a} (inhalation rate - resident adult) m^3/day	20
IRA_{res-c} (inhalation rate - resident child) m^3/day	10
$IFA_{res-adj}$ (age-adjusted inhalation factor) m^3	161000
GSF_a (gamma shielding factor - air) unitless	1.0

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Site-Specific

Resident PRGs for Air - Secular Equilibrium

Isotope	Inhalation PRG (no decay) TR=1.0E-6 (pCi/m³)	External Exposure PRG (no decay) TR=1.0E-6 (pCi/m³)	Total PRG (no decay) TR=1.0E-6 (pCi/m³)
**Secular Equilibrium PRG for Be-7*	*2.88E+01*	*1.94E+02*	***2.51E+01***
**Secular Equilibrium PRG for Bi-212*	*5.50E-02*	*6.50E+00*	***5.45E-02***
**Secular Equilibrium PRG for Bi-214*	*2.01E-04*	*5.98E+00*	***2.01E-04***
**Secular Equilibrium PRG for Cs-137*	*5.52E-02*	*1.68E+01*	***5.50E-02***
**Secular Equilibrium PRG for K-40*	*2.80E-02*	*5.53E+01*	***2.80E-02***
**Secular Equilibrium PRG for Pa-234m*	*5.13E-05*	*5.11E+00*	***5.13E-05***
**Secular Equilibrium PRG for Pb-210*	*2.01E-04*	*4.33E+03*	***2.01E-04***
**Secular Equilibrium PRG for Pb-212*	*8.37E-03*	*5.96E+00*	***8.36E-03***
**Secular Equilibrium PRG for Pb-214*	*2.01E-04*	*5.19E+00*	***2.01E-04***
**Secular Equilibrium PRG for Ra-226*	*1.05E-04*	*5.17E+00*	***1.05E-04***
**Secular Equilibrium PRG for Ra-228*	*3.30E-05*	*3.81E+00*	***3.30E-05***
**Secular Equilibrium PRG for Sr-90*	*1.43E-02*	*1.64E+03*	***1.43E-02***
**Secular Equilibrium PRG for Th-234*	*5.13E-05*	*5.09E+00*	***5.13E-05***
**Secular Equilibrium PRG for Tl-208*	*-*	*2.53E+00*	***2.53E+00***
**Secular Equilibrium PRG for U-235*	*1.98E-05*	*1.58E+01*	***1.98E-05***

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Receptor = child recreational user, trespasser, and visitor
Medium = soil
Site area = 100,000 square meters

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	1359344438
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	0
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	4
ET_{rec-a} (exposure time - recreator) hr/day	.	0
ET_{rec-c} (exposure time - recreator) hr/day	.	4
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	600
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	72000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	100
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	200
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Be-7	7.06E+04	1.05E+10	2.83E+01	**2.83E+01**
*Secular Equilibrium PRG for Bi-212	8.27E+03	2.00E+07	8.98E-01	**8.97E-01**
*Secular Equilibrium PRG for Bi-214	2.77E+00	7.33E+04	8.49E-01	**6.50E-01**
*Secular Equilibrium PRG for Cs-137	3.26E+02	2.01E+07	2.41E+00	**2.39E+00**
*Secular Equilibrium PRG for K-40	2.38E+02	1.02E+07	8.01E+00	**7.75E+00**
*Secular Equilibrium PRG for Pa-234m	2.31E+00	1.87E+04	7.36E-01	**5.58E-01**
*Secular Equilibrium PRG for Pb-210	2.77E+00	7.35E+04	1.47E+03	**2.76E+00**
*Secular Equilibrium PRG for Pb-212	2.14E+02	3.05E+06	8.41E-01	**8.38E-01**
*Secular Equilibrium PRG for Pb-214	2.77E+00	7.32E+04	7.47E-01	**5.88E-01**
*Secular Equilibrium PRG for Ra-226	2.44E+00	3.83E+04	7.44E-01	**5.70E-01**
*Secular Equilibrium PRG for Ra-228	5.11E+00	1.20E+04	5.44E-01	**4.91E-01**
*Secular Equilibrium PRG for Sr-90	1.03E+02	5.22E+06	3.12E+02	**7.72E+01**
*Secular Equilibrium PRG for Th-234	2.29E+00	1.87E+04	7.34E-01	**5.56E-01**
*Secular Equilibrium PRG for Tl-208	-	-	3.47E-01	**3.47E-01**
*Secular Equilibrium PRG for U-235	9.45E+00	7.20E+03	2.69E+00	**2.09E+00**

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Receptor = adolescent recreator, trespasser, visitor
Exposure medium = soil
Site area of 100,000 square meters

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	1359344438
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	4
ET_{rec-a} (exposure time - recreator) hr/day	.	4
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1800
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	54000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	100
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	200
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Be-7	9.41E+04	3.51E+09	1.89E+01	**1.89E+01**
*Secular Equilibrium PRG for Bi-212	1.10E+04	6.68E+06	5.98E-01	**5.98E-01**
*Secular Equilibrium PRG for Bi-214	3.69E+00	2.44E+04	5.66E-01	**4.91E-01**
*Secular Equilibrium PRG for Cs-137	4.35E+02	6.71E+06	1.61E+00	**1.60E+00**
*Secular Equilibrium PRG for K-40	3.17E+02	3.40E+06	5.34E+00	**5.25E+00**
*Secular Equilibrium PRG for Pa-234m	3.08E+00	6.24E+03	4.90E-01	**4.23E-01**
*Secular Equilibrium PRG for Pb-210	3.69E+00	2.45E+04	9.80E+02	**3.68E+00**
*Secular Equilibrium PRG for Pb-212	2.85E+02	1.02E+06	5.61E-01	**5.59E-01**
*Secular Equilibrium PRG for Pb-214	3.69E+00	2.44E+04	4.98E-01	**4.39E-01**
*Secular Equilibrium PRG for Ra-226	3.25E+00	1.28E+04	4.96E-01	**4.31E-01**
*Secular Equilibrium PRG for Ra-228	6.81E+00	4.01E+03	3.63E-01	**3.44E-01**
*Secular Equilibrium PRG for Sr-90	1.37E+02	1.74E+06	2.08E+02	**8.26E+01**
*Secular Equilibrium PRG for Th-234	3.05E+00	6.24E+03	4.89E-01	**4.22E-01**
*Secular Equilibrium PRG for Tl-208	-	-	2.32E-01	**2.32E-01**
*Secular Equilibrium PRG for U-235	1.26E+01	2.40E+03	1.79E+00	**1.57E+00**

Adolescent trespasser, visitor, recreator exposed to site soil

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Receptor = adult recreator, trespasser, and visitor
Exposure medium = soil
Site area = 100,000 square meters

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	1359344438
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	4
ET_{rec-a} (exposure time - recreator) hr/day	.	4
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	4000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	120000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	100
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	200
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Be-7	4.23E+04	1.58E+09	8.49E+00	**8.49E+00**
*Secular Equilibrium PRG for Bi-212	4.96E+03	3.01E+06	2.69E-01	**2.69E-01**
*Secular Equilibrium PRG for Bi-214	1.66E+00	1.10E+04	2.55E-01	**2.21E-01**
*Secular Equilibrium PRG for Cs-137	1.96E+02	3.02E+06	7.22E-01	**7.20E-01**
*Secular Equilibrium PRG for K-40	1.43E+02	1.53E+06	2.40E+00	**2.36E+00**
*Secular Equilibrium PRG for Pa-234m	1.39E+00	2.81E+03	2.21E-01	**1.90E-01**
*Secular Equilibrium PRG for Pb-210	1.66E+00	1.10E+04	4.41E+02	**1.66E+00**
*Secular Equilibrium PRG for Pb-212	1.28E+02	4.58E+05	2.52E-01	**2.52E-01**
*Secular Equilibrium PRG for Pb-214	1.66E+00	1.10E+04	2.24E-01	**1.97E-01**
*Secular Equilibrium PRG for Ra-226	1.46E+00	5.75E+03	2.23E-01	**1.94E-01**
*Secular Equilibrium PRG for Ra-228	3.07E+00	1.81E+03	1.63E-01	**1.55E-01**
*Secular Equilibrium PRG for Sr-90	6.15E+01	7.83E+05	9.37E+01	**3.71E+01**
*Secular Equilibrium PRG for Th-234	1.37E+00	2.81E+03	2.20E-01	**1.90E-01**
*Secular Equilibrium PRG for Tl-208	-	-	1.04E-01	**1.04E-01**
*Secular Equilibrium PRG for U-235	5.67E+00	1.08E+03	8.08E-01	**7.07E-01**

Adult recreator, trespasser, visitor
Site soil

Site-Specific
Outdoor Worker Soil Inputs - Secular Equilibrium

*** Inputted values different from Outdoor Worker defaults are highlighted.**

Receptor = adult outdoor worker
Medium = soil
Site area of 100,000 square meters

Variable	Outdoor Worker Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	1359344438
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{ow} (exposure duration - outdoor worker) yr	25	25
EF_{ow} (exposure frequency - outdoor worker) day/yr	225	225
ET_{ow} (exposure time - outdoor worker) hr/day	8	8
IRA_{ow} (inhalation rate - outdoor worker) m^3/day	60	60
IRS_{ow} (soil intake rate - outdoor worker) mg/day	100	100
t_{ow} (time - outdoor worker) yr	25	25
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-Specific
Outdoor Worker PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Be-7*	*3.48E+04*	*5.61E+07*	*9.06E-01*	***9.06E-01***
**Secular Equilibrium PRG for Bi-212*	*4.00E+03*	*1.07E+05*	*2.87E-02*	***2.87E-02***
**Secular Equilibrium PRG for Bi-214*	*8.72E-01*	*3.91E+02*	*2.72E-02*	***2.64E-02***
**Secular Equilibrium PRG for Cs-137*	*5.59E+01*	*1.07E+05*	*7.70E-02*	***7.69E-02***
**Secular Equilibrium PRG for K-40*	*1.18E+02*	*5.44E+04*	*2.56E-01*	***2.56E-01***
**Secular Equilibrium PRG for Pa-234m*	*7.22E-01*	*9.98E+01*	*2.35E-02*	***2.28E-02***
**Secular Equilibrium PRG for Pb-210*	*8.72E-01*	*3.92E+02*	*4.71E+01*	***8.54E-01***
**Secular Equilibrium PRG for Pb-212*	*1.31E+02*	*1.63E+04*	*2.69E-02*	***2.69E-02***
**Secular Equilibrium PRG for Pb-214*	*8.72E-01*	*3.90E+02*	*2.39E-02*	***2.33E-02***
**Secular Equilibrium PRG for Ra-226*	*7.62E-01*	*2.04E+02*	*2.38E-02*	***2.31E-02***
**Secular Equilibrium PRG for Ra-228*	*2.13E+00*	*6.42E+01*	*1.74E-02*	***1.73E-02***
**Secular Equilibrium PRG for Sr-90*	*3.03E+01*	*2.78E+04*	*1.00E+01*	***7.51E+00***
**Secular Equilibrium PRG for Th-234*	*7.19E-01*	*9.98E+01*	*2.35E-02*	***2.27E-02***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.11E-02*	***1.11E-02***
**Secular Equilibrium PRG for U-235*	*3.23E+00*	*3.84E+01*	*8.62E-02*	***8.37E-02***

Outdoor worker
site soil

Output generated 19JUN2019:21:07:12

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_p (surface area of contaminated road segment) m^2	274.21393	274.21393
W_p (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1931454865539966
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_s (PEF_{ss} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	20
ET_{cw} (exposure time - construction worker) hr/day	8	8
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	60
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	330
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	672
T_t (overall duration of traffic) s	7200000	576000

Utility worker exposed to site soil.
Used site area of 100,000 square meters and
PEF of 1.12E08 m3/kg.

Output generated 20JUN2019:19:48:40

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
*Secular Equilibrium PRG for Be-7	2.97E+06	1.30E+09	2.55E+02	**2.55E+02**
*Secular Equilibrium PRG for Bi-212	3.41E+05	2.48E+06	8.08E+00	**8.08E+00**
*Secular Equilibrium PRG for Bi-214	7.43E+01	9.06E+03	7.65E+00	**6.93E+00**
*Secular Equilibrium PRG for Cs-137	4.77E+03	2.49E+06	2.17E+01	**2.16E+01**
*Secular Equilibrium PRG for K-40	1.01E+04	1.26E+06	7.21E+01	**7.16E+01**
*Secular Equilibrium PRG for Pa-234m	6.15E+01	2.31E+03	6.62E+00	**5.96E+00**
*Secular Equilibrium PRG for Pb-210	7.43E+01	9.08E+03	1.32E+04	**7.33E+01**
*Secular Equilibrium PRG for Pb-212	1.12E+04	3.77E+05	7.57E+00	**7.56E+00**
*Secular Equilibrium PRG for Pb-214	7.43E+01	9.04E+03	6.72E+00	**6.16E+00**
*Secular Equilibrium PRG for Ra-226	6.49E+01	4.73E+03	6.70E+00	**6.07E+00**
*Secular Equilibrium PRG for Ra-228	1.82E+02	1.49E+03	4.89E+00	**4.75E+00**
*Secular Equilibrium PRG for Sr-90	2.58E+03	6.45E+05	2.81E+03	**1.34E+03**
*Secular Equilibrium PRG for Th-234	6.13E+01	2.31E+03	6.61E+00	**5.95E+00**
*Secular Equilibrium PRG for Tl-208	-	-	3.13E+00	**3.13E+00**
*Secular Equilibrium PRG for U-235	2.76E+02	8.90E+02	2.42E+01	**2.17E+01**

Utility worker exposed to site soil

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_p (surface area of contaminated road segment) m^2	274.21393	274.21393
W_p (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.18583720873299323
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_s (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	250
ET_{cw} (exposure time - construction worker) hr/day	8	8
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	60
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	330
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	8400
T_t (overall duration of traffic) s	7200000	7200000

Construction worker exposed to site soil
Site area of 100,000 square meters
PEF of 4.41E06 m3/kg

Output generated 20JUN2019:19:58:06

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
*Secular Equilibrium PRG for Be-7	2.37E+05	4.10E+06	2.04E+01	**2.04E+01**
*Secular Equilibrium PRG for Bi-212	2.73E+04	7.81E+03	6.46E-01	**6.46E-01**
*Secular Equilibrium PRG for Bi-214	5.95E+00	2.85E+01	6.12E-01	**5.44E-01**
*Secular Equilibrium PRG for Cs-137	3.81E+02	7.84E+03	1.73E+00	**1.73E+00**
*Secular Equilibrium PRG for K-40	8.05E+02	3.97E+03	5.77E+00	**5.72E+00**
*Secular Equilibrium PRG for Pa-234m	4.92E+00	7.29E+00	5.30E-01	**4.49E-01**
*Secular Equilibrium PRG for Pb-210	5.95E+00	2.86E+01	1.06E+03	**4.90E+00**
*Secular Equilibrium PRG for Pb-212	8.93E+02	1.19E+03	6.05E-01	**6.05E-01**
*Secular Equilibrium PRG for Pb-214	5.94E+00	2.85E+01	5.38E-01	**4.85E-01**
*Secular Equilibrium PRG for Ra-226	5.19E+00	1.49E+01	5.36E-01	**4.71E-01**
*Secular Equilibrium PRG for Ra-228	1.46E+01	4.69E+00	3.92E-01	**3.53E-01**
*Secular Equilibrium PRG for Sr-90	2.06E+02	2.03E+03	2.25E+02	**1.02E+02**
*Secular Equilibrium PRG for Th-234	4.90E+00	7.28E+00	5.28E-01	**4.48E-01**
*Secular Equilibrium PRG for Tl-208	-	-	2.50E-01	**2.50E-01**
*Secular Equilibrium PRG for U-235	2.21E+01	2.80E+00	1.94E+00	**1.09E+00**

Construction worker exposed to site soil

Site-Specific

Indoor Worker Equation Inputs for Soil - Secular Equilibrium

Variable	Value
Site area for ACF (area correction factor) m^2	1
TR (target cancer risk) unitless	1.0E-6
t_{iw} (time - indoor worker) yr	25
EF_{iw} (exposure frequency - indoor worker) day/yr	250
ED_{iw} (exposure duration - indoor worker) yr	25
IRS_{iw} (soil intake rate - indoor worker) mg/day	50
IRA_{iw} (inhalation rate - indoor worker) m^3/day	60
ET_{iw} (exposure time - indoor worker) hr/day	8
GSF_i (indoor gamma shielding factor) unitless	0.4
City (Climate Zone)	29
A_c (acres)	0.5
Q/C_{wp} (g/m^2-s per kg/m^3)	93.77
PEF (particulate emission factor) m^3/kg	1359344438
A (PEF Dispersion Constant)	16.2302
B (PEF Dispersion Constant)	18.7762
C (PEF Dispersion Constant)	216.108
V (fraction of vegetative cover) unitless	0.5
U_m (mean annual wind speed) m/s	4.69
U_t (equivalent threshold value)	11.32
F(x) (function dependent on U_m/U_t) unitless	0.194

Output generated 24APR2018:14:10:53

Site-Specific
Indoor Worker PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=1.0E-6 (pCi/g)	Inhalation PRG TR=1.0E-6 (pCi/g)	External Exposure PRG TR=1.0E-6 (pCi/g)	Total PRG TR=1.0E-6 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*7.21E+03*	*9.62E+04*	*7.22E-01*	***7.22E-01***
**Secular Equilibrium PRG for Bi-214*	*1.57E+00*	*3.52E+02*	*6.36E-01*	***4.52E-01***
**Secular Equilibrium PRG for Cs-137*	*1.01E+02*	*9.67E+04*	*1.97E+00*	***1.93E+00***
**Secular Equilibrium PRG for K-40*	*2.12E+02*	*4.90E+04*	*5.64E+00*	***5.49E+00***
**Secular Equilibrium PRG for Pa-234m*	*1.30E+00*	*8.98E+01*	*5.61E-01*	***3.90E-01***
**Secular Equilibrium PRG for Pb-210*	*1.57E+00*	*3.53E+02*	*1.08E+03*	***1.56E+00***
**Secular Equilibrium PRG for Pb-212*	*2.36E+02*	*1.47E+04*	*6.81E-01*	***6.79E-01***
**Secular Equilibrium PRG for Pb-214*	*1.57E+00*	*3.51E+02*	*5.69E-01*	***4.17E-01***
**Secular Equilibrium PRG for Ra-226*	*1.37E+00*	*1.84E+02*	*5.68E-01*	***4.01E-01***
**Secular Equilibrium PRG for Ra-228*	*3.84E+00*	*5.78E+01*	*4.24E-01*	***3.79E-01***
**Secular Equilibrium PRG for Sr-90*	*5.45E+01*	*2.51E+04*	*1.06E+02*	***3.59E+01***
**Secular Equilibrium PRG for Th-234*	*1.29E+00*	*8.98E+01*	*5.59E-01*	***3.89E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*2.81E-01*	***2.81E-01***
**Secular Equilibrium PRG for U-235*	*5.82E+00*	*3.46E+01*	*2.27E+00*	***1.56E+00***

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	0
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	0
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	18000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = child recreator, visitor, trespasser
Exposure medium = northern drainage channel sediment
Site area = 100 square meters
Set PEF equal to zero because sediment-to-air pathway not complete for this receptor
Used sediment ingestion rate of 50 mg/day and exposure time of 1 hr/day to account for receptor's exposure to other wetlands/sediment on the same site visit.

Output generated 20JUN2019:08:09:13

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Ra-226	9.76E+00	-	3.88E+00	**2.78E+00**
*Secular Equilibrium PRG for Ra-228	2.04E+01	-	2.79E+00	**2.45E+00**

Child recreator, trespasser, visitor
Exposed to sediment in northern drainage channel

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	450
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	13500
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adolescent recreator, visitor, trespasser
Exposure medium = northern drainage channel sediment
Site area = 100 square meters
Set PEF equal to zero because sediment-to-air pathway not complete for this receptor
Used sediment ingestion rate of 25 mg/day and exposure time of 1 hr/day to account for receptor's exposure to other wetlands/sediment on the same site visit.

Output generated 20JUN2019:08:15:36

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Ra-226*	*1.30E+01*	*-*	*2.59E+00*	***2.16E+00***
**Secular Equilibrium PRG for Ra-228*	*2.73E+01*	*-*	*1.86E+00*	***1.74E+00***

Adolescent recreator/trespasser/visitor exposed to sediment in northern drainage channel

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	30000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult recreator, visitor, trespasser
Exposure medium = northern drainage channel sediment
Site area = 100 square meters
Set PEF equal to zero because sediment-to-air pathway not complete for this receptor
Used sediment ingestion rate of 25 mg/day and exposure time of 1 hr/day to account for receptor's exposure to other wetlands/sediment on the same site visit.

Output generated 20JUN2019:08:19:26

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Ra-226*	*5.85E+00*	*-*	*1.17E+00*	***9.72E-01***
**Secular Equilibrium PRG for Ra-228*	*1.23E+01*	*-*	*8.36E-01*	***7.83E-01***

Adult recreator/trespasser/visitor exposed to sediment in northern drainage channel

Output generated 20JUN2019:08:19:26

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

Receptor = age-adjusted resident
Exposure medium = northern drainage channel sediment
Decreased ingestion rate to 50 mg/day (child) and 25 mg/day (adult) to account for exposure to other sediment areas.
Decreased exposure time to 1 hr/day.

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	48000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Ra-226*	*3.66E+00*	*-*	*8.96E-01*	***7.20E-01***
**Secular Equilibrium PRG for Ra-228*	*7.67E+00*	*-*	*6.43E-01*	***5.93E-01***

Age-adjusted resident exposed to sediment in northern drainage channel

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_p (surface area of contaminated road segment) m^2	274.21393	274.21393
W_p (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1931454865539966
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	20
ET_{cw} (exposure time - construction worker) hr/day	8	2
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	15
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	82.5
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	672
T_t (overall duration of traffic) s	7200000	144000

Receptor = utility worker
Exposure medium = northern drainage channel sediment
Used exposure time of 2 hr/day, inhalation rate of 15 m3/day, and soil ingestion rate of 82.5 mg/day to account for exposure to other sediment on site.
Used site area of 100 square meters.
Set PEF equal to zero because radionuclides are not sediment-to-air COPCs.

Output generated 20JUN2019:08:43:32

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Ra-226*	*2.60E+02*	-	*3.50E+01*	***3.08E+01***
**Secular Equilibrium PRG for Ra-228*	*7.28E+02*	-	*2.51E+01*	***2.42E+01***

Utility worker exposed to sediment in northern drainage channel

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

Receptor = child recreator, trespasser, visitor
Exposure medium = freshwater wetland sediment
Site area = 500 square meters
Used sediment ingestion rate of 50 mg/day to account for exposure to other sediment areas
Used exposure time of 1 hr/day to account for exposure to other areas
Set PEF equal to zero because sediment-to-air pathway not complete.

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	0
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	0
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	18000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Output generated 20JUN2019:09:20:12

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*3.31E+04*	-	*4.02E+00*	***4.02E+00***
**Secular Equilibrium PRG for Bi-214*	*1.11E+01*	-	*3.86E+00*	***2.86E+00***
**Secular Equilibrium PRG for K-40*	*9.50E+02*	-	*3.47E+01*	***3.35E+01***
**Secular Equilibrium PRG for Pb-212*	*8.55E+02*	-	*3.81E+00*	***3.79E+00***
**Secular Equilibrium PRG for Pb-214*	*1.11E+01*	-	*3.45E+00*	***2.63E+00***
**Secular Equilibrium PRG for Ra-226*	*9.76E+00*	-	*3.44E+00*	***2.55E+00***
**Secular Equilibrium PRG for Ra-228*	*2.04E+01*	-	*2.49E+00*	***2.22E+00***
**Secular Equilibrium PRG for Th-234*	*9.15E+00*	-	*3.40E+00*	***2.48E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.55E+00*	***1.55E+00***

Child recreator/trespasser/visitor exposed to freshwater wetland sediment.

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	450
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	13500
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adolescent recreator, trespasser, visitor
Exposure medium = freshwater wetland sediment
Site area = 500 square meters
Used sediment ingestion rate of 25 mg/day to account for exposure to other sediment areas
Used exposure time of 1 hr/day to account for exposure to other areas
Set PEF equal to zero because sediment-to-air pathway not complete.

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*4.41E+04*	-	*2.68E+00*	***2.68E+00***
**Secular Equilibrium PRG for Bi-214*	*1.48E+01*	-	*2.57E+00*	***2.19E+00***
**Secular Equilibrium PRG for K-40*	*1.27E+03*	-	*2.31E+01*	***2.27E+01***
**Secular Equilibrium PRG for Pb-212*	*1.14E+03*	-	*2.54E+00*	***2.53E+00***
**Secular Equilibrium PRG for Pb-214*	*1.48E+01*	-	*2.30E+00*	***1.99E+00***
**Secular Equilibrium PRG for Ra-226*	*1.30E+01*	-	*2.30E+00*	***1.95E+00***
**Secular Equilibrium PRG for Ra-228*	*2.73E+01*	-	*1.66E+00*	***1.56E+00***
**Secular Equilibrium PRG for Th-234*	*1.22E+01*	-	*2.26E+00*	***1.91E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.03E+00*	***1.03E+00***

Adolescent recreator/trespasser/visitor exposed to sediment in freshwater wetland

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	30000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult recreator, trespasser, visitor
Exposure medium = freshwater wetland sediment
Site area = 500 square meters
Used sediment ingestion rate of 25 mg/day to account for exposure to other sediment areas
Used exposure time of 1 hr/day to account for exposure to other areas
Set PEF equal to zero because sediment-to-air pathway not complete.

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	1.98E+04	-	1.21E+00	**1.21E+00**
*Secular Equilibrium PRG for Bi-214	6.65E+00	-	1.16E+00	**9.86E-01**
*Secular Equilibrium PRG for K-40	5.70E+02	-	1.04E+01	**1.02E+01**
*Secular Equilibrium PRG for Pb-212	5.13E+02	-	1.14E+00	**1.14E+00**
*Secular Equilibrium PRG for Pb-214	6.64E+00	-	1.04E+00	**8.96E-01**
*Secular Equilibrium PRG for Ra-226	5.85E+00	-	1.03E+00	**8.78E-01**
*Secular Equilibrium PRG for Ra-228	1.23E+01	-	7.46E-01	**7.03E-01**
*Secular Equilibrium PRG for Th-234	5.49E+00	-	1.02E+00	**8.59E-01**
*Secular Equilibrium PRG for Tl-208	-	-	4.65E-01	**4.65E-01**

Adult recreator/trespasser/visitor exposed to sediment in freshwater wetland

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Age-adjusted resident exposed to sediment in freshwater wetland.
Used site area of 500 square meters.
Adjusted soil ingestion rate to 50 mg/day (child) and 25 mg/day (adult) to account for exposure to other sediment areas.
Adjusted exposure time to 1 hr/day to account for exposure to other sediment.
Set PEF equal to zero because soil-to-air pathway is not complete for sediment.

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	48000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Output generated 20JUN2019:10:38:44

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.24E+04*	-	*9.27E-01*	***9.27E-01***
**Secular Equilibrium PRG for Bi-214*	*4.15E+00*	-	*8.91E-01*	***7.34E-01***
**Secular Equilibrium PRG for K-40*	*3.56E+02*	-	*8.01E+00*	***7.83E+00***
**Secular Equilibrium PRG for Pb-212*	*3.21E+02*	-	*8.78E-01*	***8.76E-01***
**Secular Equilibrium PRG for Pb-214*	*4.15E+00*	-	*7.97E-01*	***6.68E-01***
**Secular Equilibrium PRG for Ra-226*	*3.66E+00*	-	*7.95E-01*	***6.53E-01***
**Secular Equilibrium PRG for Ra-228*	*7.67E+00*	-	*5.74E-01*	***5.34E-01***
**Secular Equilibrium PRG for Th-234*	*3.43E+00*	-	*7.84E-01*	***6.38E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*3.58E-01*	***3.58E-01***

Age-adjusted resident exposed to sediment in freshwater wetland.

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_p (surface area of contaminated road segment) m^2	274.21393	274.21393
W_p (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1931454865539966
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	20
ET_{cw} (exposure time - construction worker) hr/day	8	2
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	15
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	82.5
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	672
T_t (overall duration of traffic) s	7200000	144000

Utility worker exposed to sediment in freshwater wetland. Decreased exposure rates to 82.5 mg/day sediment, 2 hr/day exposure time, and 15 m3/day inhalation to account for exposure to other sediment areas.
Hand-entered PEF of 1.12E08 to match the PEF used in Table 3.5.
Used contaminated site area of 500 square meters.

Output generated 20JUN2019:11:10:43

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.37E+06*	*3.96E+07*	*3.62E+01*	***3.62E+01***
**Secular Equilibrium PRG for Bi-214*	*2.97E+02*	*1.45E+05*	*3.47E+01*	***3.11E+01***
**Secular Equilibrium PRG for K-40*	*4.02E+04*	*2.02E+07*	*3.12E+02*	***3.10E+02***
**Secular Equilibrium PRG for Pb-212*	*4.46E+04*	*6.04E+06*	*3.43E+01*	***3.42E+01***
**Secular Equilibrium PRG for Pb-214*	*2.97E+02*	*1.45E+05*	*3.11E+01*	***2.81E+01***
**Secular Equilibrium PRG for Ra-226*	*2.60E+02*	*7.57E+04*	*3.10E+01*	***2.77E+01***
**Secular Equilibrium PRG for Ra-228*	*7.28E+02*	*2.38E+04*	*2.24E+01*	***2.17E+01***
**Secular Equilibrium PRG for Th-234*	*2.45E+02*	*3.70E+04*	*3.06E+01*	***2.72E+01***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.39E+01*	***1.39E+01***

Utility worker, freshwater wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	18000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = child trespasser/visitor
Exposure medium = estuarine wetlands
Used site area of 20,000 square meters (approx 6 acres)
Adjusted soil ingestion rate to 50 mg/day and exposure time to 1 hr/day to account for exposure to northern drainage channel, freshwater wetland, and Paradise Creek.

Output generated 20JUN2019:12:09:14

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*3.31E+04*	-	*3.71E+00*	***3.71E+00***
**Secular Equilibrium PRG for Bi-214*	*1.11E+01*	-	*3.51E+00*	***2.67E+00***
**Secular Equilibrium PRG for K-40*	*9.50E+02*	-	*3.25E+01*	***3.14E+01***
**Secular Equilibrium PRG for Pb-212*	*8.55E+02*	-	*3.49E+00*	***3.48E+00***
**Secular Equilibrium PRG for Pb-214*	*1.11E+01*	-	*3.10E+00*	***2.42E+00***
**Secular Equilibrium PRG for Ra-226*	*9.76E+00*	-	*3.09E+00*	***2.35E+00***
**Secular Equilibrium PRG for Ra-228*	*2.04E+01*	-	*2.25E+00*	***2.03E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.44E+00*	***1.44E+00***

Child trespasser/visitor, estaurine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Receptor = adolescent trespasser/visitor
Exposure medium = estuarine wetlands
Used site area of 20,000 square meters (approx 6 acres)
Adjusted soil ingestion rate to 25 mg/day and exposure time to 1 hr/day to account for exposure to northern drainage channel, freshwater wetland, and Paradise Creek.

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	450
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	13500
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	4.41E+04	-	2.48E+00	**2.47E+00**
*Secular Equilibrium PRG for Bi-214	1.48E+01	-	2.34E+00	**2.02E+00**
*Secular Equilibrium PRG for K-40	1.27E+03	-	2.17E+01	**2.13E+01**
*Secular Equilibrium PRG for Pb-212	1.14E+03	-	2.33E+00	**2.32E+00**
*Secular Equilibrium PRG for Pb-214	1.48E+01	-	2.07E+00	**1.81E+00**
*Secular Equilibrium PRG for Ra-226	1.30E+01	-	2.06E+00	**1.78E+00**
*Secular Equilibrium PRG for Ra-228	2.73E+01	-	1.50E+00	**1.42E+00**
*Secular Equilibrium PRG for Tl-208	-	-	9.57E-01	**9.57E-01**

Adolescent trespasser/visitor in estuarine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	30000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult trespasser/visitor
Exposure medium = estuarine wetlands
Used site area of 20,000 square meters (approx 6 acres)
Adjusted soil ingestion rate to 25 mg/day and exposure time to 1 hr/day to account for exposure to northern drainage channel, freshwater wetland, and Paradise Creek.

Output generated 20JUN2019:12:49:57

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	1.98E+04	-	1.11E+00	**1.11E+00**
*Secular Equilibrium PRG for Bi-214	6.65E+00	-	1.05E+00	**9.10E-01**
*Secular Equilibrium PRG for K-40	5.70E+02	-	9.75E+00	**9.58E+00**
*Secular Equilibrium PRG for Pb-212	5.13E+02	-	1.05E+00	**1.04E+00**
*Secular Equilibrium PRG for Pb-214	6.64E+00	-	9.30E-01	**8.16E-01**
*Secular Equilibrium PRG for Ra-226	5.85E+00	-	9.28E-01	**8.01E-01**
*Secular Equilibrium PRG for Ra-228	1.23E+01	-	6.75E-01	**6.39E-01**
*Secular Equilibrium PRG for Tl-208	-	-	4.31E-01	**4.31E-01**

Adult trespasser/visitor exposed to sediment in estuarine wetland

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	48000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = age-adjusted resident
Exposure medium = estuarine wetland
Sediment ingestion rates of 25 mg/day (child) and 50 mg/day (adult) to account for exposure to other sediments.
Exposure time of 1 hr/day.
Site area of 20,000 square meters (approx 6 ac).

Output generated 20JUN2019:13:32:18

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	1.24E+04	-	8.57E-01	**8.57E-01**
*Secular Equilibrium PRG for Bi-214	4.15E+00	-	8.11E-01	**6.78E-01**
*Secular Equilibrium PRG for K-40	3.56E+02	-	7.50E+00	**7.34E+00**
*Secular Equilibrium PRG for Pb-212	3.21E+02	-	8.05E-01	**8.03E-01**
*Secular Equilibrium PRG for Pb-214	4.15E+00	-	7.16E-01	**6.10E-01**
*Secular Equilibrium PRG for Ra-226	3.66E+00	-	7.14E-01	**5.97E-01**
*Secular Equilibrium PRG for Ra-228	7.67E+00	-	5.19E-01	**4.86E-01**
*Secular Equilibrium PRG for Tl-208	-	-	3.31E-01	**3.31E-01**

Age-adjusted resident
Estuarine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	0
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	0
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	300
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	36000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = child recreator/fisherman
Exposure medium = estuarine wetland sediment
Site Area = 20,000 square meters
Used ingestion rate of 100 mg/day and exposure time of 2 hr/day to account for exposure to Paradise Creek.

Output generated 20JUN2019:13:03:24

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.65E+04*	-	*1.86E+00*	***1.86E+00***
**Secular Equilibrium PRG for Bi-214*	*5.54E+00*	-	*1.76E+00*	***1.33E+00***
**Secular Equilibrium PRG for K-40*	*4.75E+02*	-	*1.62E+01*	***1.57E+01***
**Secular Equilibrium PRG for Pb-212*	*4.28E+02*	-	*1.74E+00*	***1.74E+00***
**Secular Equilibrium PRG for Pb-214*	*5.54E+00*	-	*1.55E+00*	***1.21E+00***
**Secular Equilibrium PRG for Ra-226*	*4.88E+00*	-	*1.55E+00*	***1.17E+00***
**Secular Equilibrium PRG for Ra-228*	*1.02E+01*	-	*1.12E+00*	***1.01E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*7.18E-01*	***7.18E-01***

Child fisherman exposed to sediment in estuarine wetland

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	900
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	27000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adolescent recreator/fisherman
Exposure medium = estuarine wetland sediment
Site Area = 20,000 square meters
Used ingestion rate of 50 mg/day and exposure time of 2 hr/day to account for exposure to Paradise Creek.

Output generated 20JUN2019:13:09:08

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	2.20E+04	-	1.24E+00	**1.24E+00**
*Secular Equilibrium PRG for Bi-214	7.38E+00	-	1.17E+00	**1.01E+00**
*Secular Equilibrium PRG for K-40	6.34E+02	-	1.08E+01	**1.06E+01**
*Secular Equilibrium PRG for Pb-212	5.70E+02	-	1.16E+00	**1.16E+00**
*Secular Equilibrium PRG for Pb-214	7.38E+00	-	1.03E+00	**9.07E-01**
*Secular Equilibrium PRG for Ra-226	6.51E+00	-	1.03E+00	**8.90E-01**
*Secular Equilibrium PRG for Ra-228	1.36E+01	-	7.50E-01	**7.10E-01**
*Secular Equilibrium PRG for Tl-208	-	-	4.79E-01	**4.79E-01**

Adolescent fisherman
Estuarine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	0
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	0
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	2000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	60000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult recreator/fisherman
Exposure medium = estuarine wetland sediment
Site Area = 20,000 square meters
Used ingestion rate of 50 mg/day and exposure time of 2 hr/day to account for exposure to Paradise Creek.

Output generated 20JUN2019:13:13:29

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*9.92E+03*	*-*	*5.57E-01*	***5.57E-01***
**Secular Equilibrium PRG for Bi-214*	*3.32E+00*	*-*	*5.27E-01*	***4.55E-01***
**Secular Equilibrium PRG for K-40*	*2.85E+02*	*-*	*4.87E+00*	***4.79E+00***
**Secular Equilibrium PRG for Pb-212*	*2.57E+02*	*-*	*5.23E-01*	***5.22E-01***
**Secular Equilibrium PRG for Pb-214*	*3.32E+00*	*-*	*4.65E-01*	***4.08E-01***
**Secular Equilibrium PRG for Ra-226*	*2.93E+00*	*-*	*4.64E-01*	***4.00E-01***
**Secular Equilibrium PRG for Ra-228*	*6.13E+00*	*-*	*3.37E-01*	***3.20E-01***
**Secular Equilibrium PRG for Tl-208*	*-*	*-*	*2.15E-01*	***2.15E-01***

Adult recreator/fisherman
estuarine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	2300
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	96000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = age-adjusted subsistence fisherman
Exposure medium = estuarine wetland sediment
Ingestion rates of 100 mg/day (child) and 50 mg/day (adult) to account for combined exposure to Paradise Creek.
Exposure time of 2 hr/day.
Site area of 20,000 square meters (approx 6 ac).

Output generated 20JUN2019:13:20:36

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*6.20E+03*	-	*4.28E-01*	***4.28E-01***
**Secular Equilibrium PRG for Bi-214*	*2.08E+00*	-	*4.05E-01*	***3.39E-01***
**Secular Equilibrium PRG for K-40*	*1.78E+02*	-	*3.75E+00*	***3.67E+00***
**Secular Equilibrium PRG for Pb-212*	*1.60E+02*	-	*4.03E-01*	***4.02E-01***
**Secular Equilibrium PRG for Pb-214*	*2.08E+00*	-	*3.58E-01*	***3.05E-01***
**Secular Equilibrium PRG for Ra-226*	*1.83E+00*	-	*3.57E-01*	***2.99E-01***
**Secular Equilibrium PRG for Ra-228*	*3.83E+00*	-	*2.59E-01*	***2.43E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.66E-01*	***1.66E-01***

Adult-child subsistence fisherman
Estuarine wetland sediment

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_p (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_p (surface area of contaminated road segment) m^2	274.21393	274.21393
W_p (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1931454865539966
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	20
ET_{cw} (exposure time - construction worker) hr/day	8	2
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	15
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	82.5
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	672
T_t (overall duration of traffic) s	7200000	144000

Utility worker in estuarine wetland sediment.
Used site area of 20,000 square meters.
Used soil ingestion rate of 82.5 mg/day, exposure time of 2 hr/day, and inhalation rate of 15 m3/day to account for exposure to other sediments.

Output generated 20JUN2019:15:36:05

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.37E+06*	-	*3.34E+01*	***3.34E+01***
**Secular Equilibrium PRG for Bi-214*	*2.97E+02*	-	*3.16E+01*	***2.86E+01***
**Secular Equilibrium PRG for K-40*	*4.02E+04*	-	*2.92E+02*	***2.90E+02***
**Secular Equilibrium PRG for Pb-212*	*4.46E+04*	-	*3.14E+01*	***3.14E+01***
**Secular Equilibrium PRG for Pb-214*	*2.97E+02*	-	*2.79E+01*	***2.55E+01***
**Secular Equilibrium PRG for Ra-226*	*2.60E+02*	-	*2.78E+01*	***2.51E+01***
**Secular Equilibrium PRG for Ra-228*	*7.28E+02*	-	*2.02E+01*	***1.97E+01***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.29E+01*	***1.29E+01***

Utility worker in estuarine wetland sediment.

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_D (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_D (surface area of contaminated road segment) m^2	274.21393	274.21393
W_D (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.18696935015904512
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	90
ET_{cw} (exposure time - construction worker) hr/day	8	4
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	30
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	165
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	3024
T_t (overall duration of traffic) s	7200000	1296000

Dock worker exposed to sediment in estuarine wetland.
Site area of 20,000 square meters.
Decreased exposure rates by half (165 mg/day sediment; 4 hr/day exposure time; 30 m3/day inhalation) to account for exposure to sediment in Paradise Creek.

Output generated 20JUN2019:15:42:27

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.52E+05*	-	*3.71E+00*	***3.71E+00***
**Secular Equilibrium PRG for Bi-214*	*3.30E+01*	-	*3.51E+00*	***3.17E+00***
**Secular Equilibrium PRG for K-40*	*4.47E+03*	-	*3.25E+01*	***3.23E+01***
**Secular Equilibrium PRG for Pb-212*	*4.96E+03*	-	*3.49E+00*	***3.49E+00***
**Secular Equilibrium PRG for Pb-214*	*3.30E+01*	-	*3.10E+00*	***2.83E+00***
**Secular Equilibrium PRG for Ra-226*	*2.89E+01*	-	*3.09E+00*	***2.79E+00***
**Secular Equilibrium PRG for Ra-228*	*8.09E+01*	-	*2.25E+00*	***2.19E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.44E+00*	***1.44E+00***

Dock worker
Estuarine wetland sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	18000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = child trespasser/visitor
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to other sediment areas.

Output generated 20JUN2019:16:22:38

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	3.31E+04	-	3.71E+00	**3.71E+00**
*Secular Equilibrium PRG for Bi-214	1.11E+01	-	3.51E+00	**2.67E+00**
*Secular Equilibrium PRG for Cs-137	1.31E+03	-	1.05E+01	**1.04E+01**
*Secular Equilibrium PRG for K-40	9.50E+02	-	3.25E+01	**3.14E+01**
*Secular Equilibrium PRG for Pb-212	8.55E+02	-	3.49E+00	**3.48E+00**
*Secular Equilibrium PRG for Pb-214	1.11E+01	-	3.10E+00	**2.42E+00**
*Secular Equilibrium PRG for Ra-228	2.04E+01	-	2.25E+00	**2.03E+00**
*Secular Equilibrium PRG for Tl-208	-	-	1.44E+00	**1.44E+00**

Child trespasser/visitor
Paradise Creek sediment

Output generated 20JUN2019:16:22:38

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	450
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	13500
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adolescent trespasser/visitor
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to other sediment areas.

Output generated 20JUN2019:16:33:06

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*4.41E+04*	-	*2.48E+00*	***2.47E+00***
**Secular Equilibrium PRG for Bi-214*	*1.48E+01*	-	*2.34E+00*	***2.02E+00***
**Secular Equilibrium PRG for Cs-137*	*1.74E+03*	-	*6.99E+00*	***6.96E+00***
**Secular Equilibrium PRG for K-40*	*1.27E+03*	-	*2.17E+01*	***2.13E+01***
**Secular Equilibrium PRG for Pb-212*	*1.14E+03*	-	*2.33E+00*	***2.32E+00***
**Secular Equilibrium PRG for Pb-214*	*1.48E+01*	-	*2.07E+00*	***1.81E+00***
**Secular Equilibrium PRG for Ra-228*	*2.73E+01*	-	*1.50E+00*	***1.42E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*9.57E-01*	***9.57E-01***

adolescent trespasser/visitor
Paradise Creek sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	30000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult trespasser/visitor
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to other sediment areas.

Output generated 20JUN2019:16:45:31

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.98E+04*	-	*1.11E+00*	***1.11E+00***
**Secular Equilibrium PRG for Bi-214*	*6.65E+00*	-	*1.05E+00*	***9.10E-01***
**Secular Equilibrium PRG for Cs-137*	*7.83E+02*	-	*3.15E+00*	***3.13E+00***
**Secular Equilibrium PRG for K-40*	*5.70E+02*	-	*9.75E+00*	***9.58E+00***
**Secular Equilibrium PRG for Pb-212*	*5.13E+02*	-	*1.05E+00*	***1.04E+00***
**Secular Equilibrium PRG for Pb-214*	*6.64E+00*	-	*9.30E-01*	***8.16E-01***
**Secular Equilibrium PRG for Ra-228*	*1.23E+01*	-	*6.75E-01*	***6.39E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*4.31E-01*	***4.31E-01***

Adult trespasser/visitor
Paradise Creek sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	1
ET_{rec-a} (exposure time - recreator) hr/day	.	1
ET_{rec-c} (exposure time - recreator) hr/day	.	1
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	1150
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	48000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	25
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	50
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = age-adjusted resident
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to other sediment areas.

Output generated 20JUN2019:17:24:37

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.24E+04*	-	*8.57E-01*	***8.57E-01***
**Secular Equilibrium PRG for Bi-214*	*4.15E+00*	-	*8.11E-01*	***6.78E-01***
**Secular Equilibrium PRG for Cs-137*	*4.90E+02*	-	*2.42E+00*	***2.41E+00***
**Secular Equilibrium PRG for K-40*	*3.56E+02*	-	*7.50E+00*	***7.34E+00***
**Secular Equilibrium PRG for Pb-212*	*3.21E+02*	-	*8.05E-01*	***8.03E-01***
**Secular Equilibrium PRG for Pb-214*	*4.15E+00*	-	*7.16E-01*	***6.10E-01***
**Secular Equilibrium PRG for Ra-228*	*7.67E+00*	-	*5.19E-01*	***4.86E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*3.31E-01*	***3.31E-01***

Age-adjusted resident
Paradise Creek sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	300
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	36000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	6
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = child recreator/fisherman
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to estuarine wetland sediment.

Output generated 20JUN2019:16:51:46

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.65E+04*	-	*1.86E+00*	***1.86E+00***
**Secular Equilibrium PRG for Bi-214*	*5.54E+00*	-	*1.76E+00*	***1.33E+00***
**Secular Equilibrium PRG for Cs-137*	*6.53E+02*	-	*5.24E+00*	***5.20E+00***
**Secular Equilibrium PRG for K-40*	*4.75E+02*	-	*1.62E+01*	***1.57E+01***
**Secular Equilibrium PRG for Pb-212*	*4.28E+02*	-	*1.74E+00*	***1.74E+00***
**Secular Equilibrium PRG for Pb-214*	*5.54E+00*	-	*1.55E+00*	***1.21E+00***
**Secular Equilibrium PRG for Ra-228*	*1.02E+01*	-	*1.12E+00*	***1.01E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*7.18E-01*	***7.18E-01***

child recreator/fisherman
Paradise Creek sediment

Output generated 20JUN2019:16:51:46

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	900
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	27000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	9
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adolescent recreator/fisherman
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to estuarine wetland sediment.

Output generated 20JUN2019:16:57:24

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*2.20E+04*	-	*1.24E+00*	***1.24E+00***
**Secular Equilibrium PRG for Bi-214*	*7.38E+00*	-	*1.17E+00*	***1.01E+00***
**Secular Equilibrium PRG for Cs-137*	*8.70E+02*	-	*3.50E+00*	***3.48E+00***
**Secular Equilibrium PRG for K-40*	*6.34E+02*	-	*1.08E+01*	***1.06E+01***
**Secular Equilibrium PRG for Pb-212*	*5.70E+02*	-	*1.16E+00*	***1.16E+00***
**Secular Equilibrium PRG for Pb-214*	*7.38E+00*	-	*1.03E+00*	***9.07E-01***
**Secular Equilibrium PRG for Ra-228*	*1.36E+01*	-	*7.50E-01*	***7.10E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*4.79E-01*	***4.79E-01***

adolescent recreator/fisherman
Paradise Creek sediment

Output generated 20JUN2019:16:57:24

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	20
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	2000
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	60000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	20
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = adult recreator/fisherman
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to estuarine wetland sediment.

Output generated 20JUN2019:17:04:55

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*9.92E+03*	*-*	*5.57E-01*	***5.57E-01***
**Secular Equilibrium PRG for Bi-214*	*3.32E+00*	*-*	*5.27E-01*	***4.55E-01***
**Secular Equilibrium PRG for Cs-137*	*3.92E+02*	*-*	*1.57E+00*	***1.57E+00***
**Secular Equilibrium PRG for K-40*	*2.85E+02*	*-*	*4.87E+00*	***4.79E+00***
**Secular Equilibrium PRG for Pb-212*	*2.57E+02*	*-*	*5.23E-01*	***5.22E-01***
**Secular Equilibrium PRG for Pb-214*	*3.32E+00*	*-*	*4.65E-01*	***4.08E-01***
**Secular Equilibrium PRG for Ra-228*	*6.13E+00*	*-*	*3.37E-01*	***3.20E-01***
**Secular Equilibrium PRG for Tl-208*	*-*	*-*	*2.15E-01*	***2.15E-01***

Adult recreator/fisherman
Paradise Creek sediment

Site-Specific
Recreator Soil Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Soil Default Value	Form-input Value
A (PEF Dispersion Constant)	16.2302	16.2302
B (PEF Dispersion Constant)	18.7762	18.7762
City (Climate Zone)	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
PEF (particulate emission factor) m^3/kg	1359344438	0
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
A_c (acres)	0.5	0.5
ED_{rec} (exposure duration - recreator) yr	.	26
ED_{rec-a} (exposure duration - recreator adult) yr	.	20
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec} (exposure frequency - recreator) day/yr	.	60
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
ET_{rec} (exposure time - recreator) hr/day	.	2
ET_{rec-a} (exposure time - recreator) hr/day	.	2
ET_{rec-c} (exposure time - recreator) hr/day	.	2
$IFA_{rec-adj}$ (age-adjusted inhalation rate - recreator) m^3	.	2300
$IFS_{rec-adj}$ (age-adjusted soil intake rate - recreator) mg	.	96000
IRA_{rec-a} (inhalation rate - recreator adult) m^3/day	20	20
IRA_{rec-c} (inhalation rate - recreator child) m^3/day	10	10
IRS_{rec-a} (soil intake rate - recreator adult) mg/day	100	50
IRS_{rec-c} (soil intake rate - recreator child) mg/day	200	100
t_{rec} (time - recreator) yr	.	26
TR (target cancer risk) unitless	1.0E-06	1.0E-06
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Receptor = age-adjusted subsistence fisherman
Exposure medium = sediment in Paradise Creek
Used site area of 20,000 square meters - it's approximately half of the investigation area in the creek, but accounts for fact that creek sediment will be exposed only periodically.
Ingestion rate and exposure time decreased to account for exposure to estuarine wetland sediment.

Output generated 20JUN2019:17:11:36

Site-Specific
Recreator PRGs for Soil - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/g)	Inhalation PRG TR=0.000001 (pCi/g)	External Exposure PRG TR=0.000001 (pCi/g)	Total PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*6.20E+03*	-	*4.28E-01*	***4.28E-01***
**Secular Equilibrium PRG for Bi-214*	*2.08E+00*	-	*4.05E-01*	***3.39E-01***
**Secular Equilibrium PRG for Cs-137*	*2.45E+02*	-	*1.21E+00*	***1.20E+00***
**Secular Equilibrium PRG for K-40*	*1.78E+02*	-	*3.75E+00*	***3.67E+00***
**Secular Equilibrium PRG for Pb-212*	*1.60E+02*	-	*4.03E-01*	***4.02E-01***
**Secular Equilibrium PRG for Pb-214*	*2.08E+00*	-	*3.58E-01*	***3.05E-01***
**Secular Equilibrium PRG for Ra-228*	*3.83E+00*	-	*2.59E-01*	***2.43E-01***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.66E-01*	***1.66E-01***

age-adjusted subsistence fisherman
Paradise Creek sediment

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_D (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_D (surface area of contaminated road segment) m^2	274.21393	274.21393
W_D (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.1931454865539966
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	20
ET_{cw} (exposure time - construction worker) hr/day	8	2
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	15
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	82.5
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	672
T_t (overall duration of traffic) s	7200000	144000

Utility worker exposed to sediment in Paradise Creek.
Exposure rates decreased by factor of 4 to account for exposure to other sediments.
Used area of 20,000 square meters.

Output generated 20JUN2019:17:33:45

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.37E+06*	-	*3.34E+01*	***3.34E+01***
**Secular Equilibrium PRG for Bi-214*	*2.97E+02*	-	*3.16E+01*	***2.86E+01***
**Secular Equilibrium PRG for Cs-137*	*1.91E+04*	-	*9.44E+01*	***9.39E+01***
**Secular Equilibrium PRG for K-40*	*4.02E+04*	-	*2.92E+02*	***2.90E+02***
**Secular Equilibrium PRG for Pb-212*	*4.46E+04*	-	*3.14E+01*	***3.14E+01***
**Secular Equilibrium PRG for Pb-214*	*2.97E+02*	-	*2.79E+01*	***2.55E+01***
**Secular Equilibrium PRG for Ra-228*	*7.28E+02*	-	*2.02E+01*	***1.97E+01***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.29E+01*	***1.29E+01***

Utility worker in Paradise Creek sediment

Site-Specific
Construction Worker Soil - Unpaved Road Traffic Inputs - Secular Equilibrium

*** Inputted values different from Construction Worker defaults are highlighted.**

Variable	Construction Worker Soil - Unpaved Default Value	Form-input Value
L_D (length of road segment) ft	147.58077	147.58077
A (Dispersion Constant)	12.9351	12.9351
A_D (surface area of contaminated road segment) m^2	274.21393	274.21393
W_D (width of road segment) ft	20	20
B (Dispersion Constant)	5.7383	5.7383
C (Dispersion Constant)	71.7711	71.7711
distance (road length) km/day	0.04498	0.04498
F_D Unitless Dispersion Correction Factor	0.185837208	0.18696935015904512
M_{dry} (road surface material moisture content under dry, uncontrolled conditions) %	0.2	0.2
Q/C_{sr} (inverse of the ratio of the 1-h. geometric mean air concentration to the emission flux along a straight road segment bisecting a square site (g/) g/m^2-s per kg/m^3	23.01785	23.01785
s (road surface silt content) %	8.5	8.5
A_c (PEF_{sc} - acres)	0.5	0.5
ED_{cw} (exposure duration - construction worker) yr	1	1
EF_{cw} (exposure frequency - construction worker) day/yr	250	90
ET_{cw} (exposure time - construction worker) hr/day	8	4
IRA_{cw} (soil inhalation rate - construction worker) m^3/day	60	30
IRS_{cw} (soil ingestion rate - construction worker) mg/day	330	165
t_{cw} (time - construction worker) yr	1	1
TR (target cancer risk) unitless	1.0E-06	1.0E-06
t_c (overall duration of construction) hours	8400	3024
T_t (overall duration of traffic) s	7200000	1296000

Dock worker exposed to sediment in Paradise Creek.
Site area of 20,000 square meters.
Decreased exposure rates by half to account for exposure to sediment in estuarine wetland.

Output generated 20JUN2019:17:38:22

Site-Specific
Construction Worker PRGs for Soil - Unpaved Road Traffic - Secular Equilibrium

Isotope	Ingestion PRG TR=1E-06 (pCi/g)	Inhalation PRG TR=1E-06 (pCi/g)	External Exposure PRG TR=1E-06 (pCi/g)	Total PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	*1.52E+05*	-	*3.71E+00*	***3.71E+00***
**Secular Equilibrium PRG for Bi-214*	*3.30E+01*	-	*3.51E+00*	***3.17E+00***
**Secular Equilibrium PRG for Cs-137*	*2.12E+03*	-	*1.05E+01*	***1.04E+01***
**Secular Equilibrium PRG for K-40*	*4.47E+03*	-	*3.25E+01*	***3.23E+01***
**Secular Equilibrium PRG for Pb-212*	*4.96E+03*	-	*3.49E+00*	***3.49E+00***
**Secular Equilibrium PRG for Pb-214*	*3.30E+01*	-	*3.10E+00*	***2.83E+00***
**Secular Equilibrium PRG for Ra-228*	*8.09E+01*	-	*2.25E+00*	***2.19E+00***
**Secular Equilibrium PRG for Tl-208*	-	-	*1.44E+00*	***1.44E+00***

Dock worker in Paradise Creek sediment

Output generated 20JUN2019:17:38:22

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	252
ED_{rec} (exposure duration - recreator) yr	.	6
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	0
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	6
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	0.7
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	0.7
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	12.6
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Child trespasser/visitor exposed to surface water in estuarine wetland, northern drainage channel, and Paradise Creek

Output generated 20JUN2019:20:47:28

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*3.22E+03*	*2.22E+07*	***3.22E+03***
**Secular Equilibrium PRG for Ra-226*	*2.60E+01*	*2.07E+06*	***2.60E+01***

Child trespasser/visitor

Output generated 20JUN2019:20:47:28

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	378
ED_{rec} (exposure duration - recreator) yr	.	9
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	9
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	0
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	0.7
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	0.7
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	18.9
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adolescent trespasser/visitor exposed to surface water.
Exposure rates adjusted to account for exposure to all 3 surface waters.

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*2.14E+03*	*1.48E+07*	***2.14E+03***
**Secular Equilibrium PRG for Ra-226*	*1.73E+01*	*1.38E+06*	***1.73E+01***

Adolescent trespasser/visitor exposed to surface water

Output generated 20JUN2019:21:03:25

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	840
ED_{rec} (exposure duration - recreator) yr	.	20
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	20
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	0
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	0.7
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	0.7
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	42
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adult trespasser/visitor exposed to surface water. Exposure rates adjusted to account for combined exposure to estuarine wetland, northern drainage channel, and Paradise Creek.

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*9.65E+02*	*6.67E+06*	***9.65E+02***
**Secular Equilibrium PRG for Ra-226*	*7.79E+00*	*6.21E+05*	***7.79E+00***

Adult trespasser/visitor exposed to surface water

Output generated 20JUN2019:21:15:04

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	1092
ED_{rec} (exposure duration - recreator) yr	.	26
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	20
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	6
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	0.7
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	0.7
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	54.6
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Age-adjusted resident exposed to surface water. Exposure rates reduced to account for exposure to estuarine wetland, northern drainage channel, and Paradise Creek.

Output generated 20JUN2019:21:19:44

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*7.42E+02*	*5.13E+06*	***7.42E+02***
**Secular Equilibrium PRG for Ra-226*	*6.00E+00*	*4.78E+05*	***6.00E+00***

Age-adjusted resident
Surface water

Output generated 20JUN2019:21:19:44

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec-adj}$ (age-adjusted immersion factor - recreator) hr	.	360
ED_{rec} (exposure duration - recreator) yr	.	6
ED_{rec-a} (exposure duration - recreator adult) yr	.	0
ED_{rec-c} (exposure duration - recreator child) yr	.	6
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
$ET_{event-rec-a}$ (exposure time - recreator adult) hr/event	.	1
$ET_{event-rec-c}$ (exposure time - recreator child) hr/event	.	1
EV_{rec-a} (number of bathing events per day - recreator adult) event/day	.	1
EV_{rec-c} (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec-adj}$ (age-adjusted water intake rate - recreator) L	.	18
IRW_{rec-a} (water intake rate - recreator adult) L/hr	0.071	0.05
IRW_{rec-c} (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Child fisher exposed to surface water. Exposure rates decreased to account for fraction exposed of 0.5.

Output generated 20JUN2019:21:24:39

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
*Secular Equilibrium PRG for K-40	2.25E+03	1.56E+07	**2.25E+03**
*Secular Equilibrium PRG for Ra-226	1.82E+01	1.45E+06	**1.82E+01**

Child fisher in surface water

Output generated 20JUN2019:21:24:39

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec-adj}$ (age-adjusted immersion factor - recreator) hr	.	540
ED_{rec} (exposure duration - recreator) yr	.	9
ED_{rec-a} (exposure duration - recreator adult) yr	.	9
ED_{rec-c} (exposure duration - recreator child) yr	.	0
EF_{rec-a} (exposure frequency - recreator adult) day/yr	.	60
EF_{rec-c} (exposure frequency - recreator child) day/yr	.	60
$ET_{event-rec-a}$ (exposure time - recreator adult) hr/event	.	1
$ET_{event-rec-c}$ (exposure time - recreator child) hr/event	.	1
EV_{rec-a} (number of bathing events per day - recreator adult) event/day	.	1
EV_{rec-c} (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec-adj}$ (age-adjusted water intake rate - recreator) L	.	27
IRW_{rec-a} (water intake rate - recreator adult) L/hr	0.071	0.05
IRW_{rec-c} (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adolescent fisherman exposed to surface water. Exposure rates adjusted to account for fraction exposed of 0.5.

Output generated 20JUN2019:21:29:27

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
*Secular Equilibrium PRG for K-40	1.50E+03	1.04E+07	**1.50E+03**
*Secular Equilibrium PRG for Ra-226	1.21E+01	9.66E+05	**1.21E+01**

Adolescent fisherman, surface water

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	1200
ED_{rec} (exposure duration - recreator) yr	.	20
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	20
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	0
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	1
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	1
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	60
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adult fisherman exposed to surface water. Exposure rates adjusted to account for fraction exposed.

Output generated 20JUN2019:21:32:15

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*6.75E+02*	*4.67E+06*	***6.75E+02***
**Secular Equilibrium PRG for Ra-226*	*5.46E+00*	*4.35E+05*	***5.46E+00***

Adult fisherman
surface water

Output generated 20JUN2019:21:32:15

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	1560
ED_{rec} (exposure duration - recreator) yr	.	26
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	20
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	6
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	60
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	60
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	1
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	1
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	78
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.05
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0.05
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Age-adjusted subsistence fisherman exposed to surface water. Exposure rates adjusted to account for fraction exposed.

Output generated 20JUN2019:21:35:29

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
*Secular Equilibrium PRG for K-40	5.19E+02	3.59E+06	**5.19E+02**
*Secular Equilibrium PRG for Ra-226	4.20E+00	3.34E+05	**4.20E+00**

Age-adjusted subsistence fisherman

Site-Specific
Recreator Surface Water Inputs - Secular Equilibrium

*** Inputted values different from Recreator defaults are highlighted.**

Variable	Recreator Surface Water Default Value	Form-input Value
$DFA_{rec\text{-}adj}$ (age-adjusted immersion factor - recreator) hr	.	2.08
ED_{rec} (exposure duration - recreator) yr	.	0.08
$ED_{rec\text{-}a}$ (exposure duration - recreator adult) yr	.	0.08
$ED_{rec\text{-}c}$ (exposure duration - recreator child) yr	.	0
$EF_{rec\text{-}a}$ (exposure frequency - recreator adult) day/yr	.	20
$EF_{rec\text{-}c}$ (exposure frequency - recreator child) day/yr	.	0
$ET_{event\text{-}rec\text{-}a}$ (exposure time - recreator adult) hr/event	.	1.3
$ET_{event\text{-}rec\text{-}c}$ (exposure time - recreator child) hr/event	.	0
$EV_{rec\text{-}a}$ (number of bathing events per day - recreator adult) event/day	.	1
$EV_{rec\text{-}c}$ (number of bathing events per day - recreator child) event/day	.	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate - recreator) L	.	0.01
$IRW_{rec\text{-}a}$ (water intake rate - recreator adult) L/hr	0.071	0.005
$IRW_{rec\text{-}c}$ (water intake rate - recreator child) L/hr	0.12	0
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Utility worker exposed to surface water. Exposure rates adjusted to account for fraction exposed.

Site-Specific
Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
**Secular Equilibrium PRG for K-40*	*4.05E+06*	*2.69E+09*	***4.05E+06***
**Secular Equilibrium PRG for Ra-226*	*3.27E+04*	*2.51E+08*	***3.27E+04***

Utility worker
surface water

Output generated 20JUN2019:21:51:36

Site-Specific

Recreator Equation Inputs for Surface Water - Secular Equilibrium

Variable	Value
TR (target cancer risk) unitless	0.000001
EF_{rec-c} (exposure frequency - recreator child) day/yr	0
EF_{rec-a} (exposure frequency - recreator adult) day/yr	20
ED_{rec-c} (exposure duration - recreator child) yr	0
ED_{rec-a} (exposure duration - recreator adult) yr	0.077
$ET_{event-rec-c}$ (exposure time - recreator child) hr/event	0
$ET_{event-rec-a}$ (exposure time - recreator adult) hr/event	4
EV_{rec-c} (number of bathing events per day - recreator child) event/day	0
EV_{rec-a} (number of bathing events per day - recreator adult) event/day	1
$DFA_{rec-adj}$ (age-adjusted immersion factor - recreator) hr	6.16
$IFW_{rec-adj}$ (age-adjusted water intake rate - recreator) L	0.031
IRW_{rec-c} (water intake rate - recreator child) L/hr	0
IRW_{rec-a} (water intake rate - recreator adult) L/hr	0.005

Site-Specific

Recreator PRGs for Surface Water - Secular Equilibrium

Isotope	Ingestion PRG TR=0.000001 (pCi/L)	Immersion PRG TR=0.000001 (pCi/L)	Total PRG TR=0.000001 (pCi/L)
*Secular Equilibrium PRG for Bi-212	4.49E+07	1.06E+08	**3.16E+07**
*Secular Equilibrium PRG for Bi-214	1.21E+04	9.81E+07	**1.21E+04**
*Secular Equilibrium PRG for Cs-137	1.06E+06	2.76E+08	**1.05E+06**
*Secular Equilibrium PRG for K-40	1.31E+06	9.09E+08	**1.31E+06**
*Secular Equilibrium PRG for Pa-234m	1.00E+04	8.36E+07	**1.00E+04**
*Secular Equilibrium PRG for Pb-210	1.21E+04	8.37E+10	**1.21E+04**
*Secular Equilibrium PRG for Pb-212	1.25E+06	9.71E+07	**1.23E+06**
*Secular Equilibrium PRG for Pb-214	1.21E+04	8.50E+07	**1.21E+04**
*Secular Equilibrium PRG for Ra-226	1.06E+04	8.47E+07	**1.06E+04**
*Secular Equilibrium PRG for Ra-228	2.41E+04	6.21E+07	**2.41E+04**
*Secular Equilibrium PRG for Sr-90	4.37E+05	3.58E+10	**4.37E+05**
*Secular Equilibrium PRG for Th-234	9.96E+03	8.33E+07	**9.96E+03**
*Secular Equilibrium PRG for Tl-208	-	4.11E+07	**4.11E+07**
*Secular Equilibrium PRG for U-235	4.41E+04	2.56E+08	**4.41E+04**

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	6
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	53700
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Child fisherman, fish consumption

Output generated 22JUN2019:21:23:57

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	3.51E+01
*Secular Equilibrium PRG for Bi-214	1.03E-02
*Secular Equilibrium PRG for Cs-137	9.49E-01
*Secular Equilibrium PRG for K-40	1.04E+00
*Secular Equilibrium PRG for Pb-212	9.67E-01
*Secular Equilibrium PRG for Pb-214	1.03E-02
*Secular Equilibrium PRG for Ra-228	1.92E-02
*Secular Equilibrium PRG for Sr-90	3.72E-01
*Secular Equilibrium PRG for Tl-208	-
*Secular Equilibrium PRG for U-235	3.63E-02

Child fisherman, fish consumption

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	9
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	114000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adolescent fisherman, fish consumption

Output generated 22JUN2019:21:25:25

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	1.10E+01
*Secular Equilibrium PRG for Bi-214	3.24E-03
*Secular Equilibrium PRG for Cs-137	2.98E-01
*Secular Equilibrium PRG for K-40	3.26E-01
*Secular Equilibrium PRG for Pb-212	3.04E-01
*Secular Equilibrium PRG for Pb-214	3.23E-03
*Secular Equilibrium PRG for Ra-228	6.02E-03
*Secular Equilibrium PRG for Sr-90	1.17E-01
*Secular Equilibrium PRG for Tl-208	-
*Secular Equilibrium PRG for U-235	1.14E-02

Adolescent fisherman, fish consumption

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	20
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	168000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adult recreational fisherman, fish consumption

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	3.37E+00
*Secular Equilibrium PRG for Bi-214	9.88E-04
*Secular Equilibrium PRG for Cs-137	9.10E-02
*Secular Equilibrium PRG for K-40	9.95E-02
*Secular Equilibrium PRG for Pb-212	9.27E-02
*Secular Equilibrium PRG for Pb-214	9.88E-04
*Secular Equilibrium PRG for Ra-228	1.84E-03
*Secular Equilibrium PRG for Sr-90	3.57E-02
*Secular Equilibrium PRG for Tl-208	-
*Secular Equilibrium PRG for U-235	3.48E-03

Adult fisherman, fish consumption

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	26
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	142000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Age-adjusted recreational consumption of fish

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=1E-06 (pCi/g)
**Secular Equilibrium PRG for Bi-214*	***8.99E-04***
**Secular Equilibrium PRG for Cs-137*	***8.28E-02***
**Secular Equilibrium PRG for K-40*	***9.05E-02***
**Secular Equilibrium PRG for Pb-214*	***8.99E-04***
**Secular Equilibrium PRG for Ra-228*	***1.67E-03***
**Secular Equilibrium PRG for Sr-90*	***3.25E-02***
**Secular Equilibrium PRG for U-235*	***3.17E-03***

Age-adjusted recreational consumption of fish

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
CF_{res_fish} (contaminated fish fraction) unitless	1	1
ED_{res} (exposure duration - resident) yr	26	26
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\_a}$ (fish ingestion rate - adult) mg/day	54000	161000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Age-adjusted subsistence fisherman, fish consumption time-weighted average ingestion rate of 161,000 mg/day

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	***6.76E-01***
**Secular Equilibrium PRG for Bi-214*	***1.98E-04***
**Secular Equilibrium PRG for Cs-137*	***1.83E-02***
**Secular Equilibrium PRG for K-40*	***2.00E-02***
**Secular Equilibrium PRG for Pb-212*	***1.86E-02***
**Secular Equilibrium PRG for Pb-214*	***1.98E-04***
**Secular Equilibrium PRG for Ra-228*	***3.69E-04***
**Secular Equilibrium PRG for Sr-90*	***7.16E-03***
**Secular Equilibrium PRG for Tl-208*	***-***
**Secular Equilibrium PRG for U-235*	***6.98E-04***

age-adjusted subsistence fisherman, fish consumption

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	6
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	41250
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Child recreational fisherman
Shellfish

Output generated 23JUN2019:14:03:08

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	4.57E+01
*Secular Equilibrium PRG for Bi-214	1.34E-02
*Secular Equilibrium PRG for Cs-137	1.24E+00
*Secular Equilibrium PRG for K-40	1.35E+00
*Secular Equilibrium PRG for Pb-212	1.26E+00
*Secular Equilibrium PRG for Pb-214	1.34E-02
*Secular Equilibrium PRG for Ra-228	2.50E-02
*Secular Equilibrium PRG for Sr-90	4.85E-01
*Secular Equilibrium PRG for Tl-208	-
*Secular Equilibrium PRG for U-235	4.73E-02

Child recreational fisherman
Shellfish

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	9
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	105000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adolescent recreational fisherman
Shellfish

Output generated 23JUN2019:14:06:44

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
*Secular Equilibrium PRG for Bi-212	1.20E+01
*Secular Equilibrium PRG for Bi-214	3.51E-03
*Secular Equilibrium PRG for Cs-137	3.24E-01
*Secular Equilibrium PRG for K-40	3.54E-01
*Secular Equilibrium PRG for Pb-212	3.30E-01
*Secular Equilibrium PRG for Pb-214	3.51E-03
*Secular Equilibrium PRG for Ra-228	6.54E-03
*Secular Equilibrium PRG for Sr-90	1.27E-01
*Secular Equilibrium PRG for Tl-208	-
*Secular Equilibrium PRG for U-235	1.24E-02

Adolescent recreational fisherman
shellfish

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
$CF_{res\text{-}fish}$ (contaminated fish fraction) unitless	1	0.25
ED_{res} (exposure duration - resident) yr	26	20
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\text{-}a}$ (fish ingestion rate - adult) mg/day	54000	176000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Adult recreational fisherman
Shellfish

Output generated 23JUN2019:14:11:50

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	***3.21E+00***
**Secular Equilibrium PRG for Bi-214*	***9.43E-04***
**Secular Equilibrium PRG for Cs-137*	***8.69E-02***
**Secular Equilibrium PRG for K-40*	***9.50E-02***
**Secular Equilibrium PRG for Pb-212*	***8.85E-02***
**Secular Equilibrium PRG for Pb-214*	***9.43E-04***
**Secular Equilibrium PRG for Ra-228*	***1.75E-03***
**Secular Equilibrium PRG for Sr-90*	***3.41E-02***
**Secular Equilibrium PRG for Tl-208*	***-***
**Secular Equilibrium PRG for U-235*	***3.32E-03***

Adult recreational fisherman
Shellfish

Site-Specific
Resident Contaminated Fish Inputs - Secular Equilibrium

*** Inputted values different from Resident defaults are highlighted.**

Variable	Resident Contaminated Fish Default Value	Form-input Value
CF_{res_fish} (contaminated fish fraction) unitless	1	1
ED_{res} (exposure duration - resident) yr	26	26
EF_{res} (exposure frequency - resident) day/yr	350	350
$IRFI_{res\_a}$ (fish ingestion rate - adult) mg/day	54000	292000
TR (target cancer risk) unitless	1.0E-06	1.0E-06

Age-adjusted subsistence fisherman
shellfish
time-weighted average ingestion rate

Output generated 23JUN2019:14:25:24

Site-Specific
Resident PRGs for Contaminated Fish - Secular Equilibrium

Isotope	Ingestion of Fish PRG TR=0.000001 (pCi/g)
**Secular Equilibrium PRG for Bi-212*	***3.73E-01***
**Secular Equilibrium PRG for Bi-214*	***1.09E-04***
**Secular Equilibrium PRG for Cs-137*	***1.01E-02***
**Secular Equilibrium PRG for K-40*	***1.10E-02***
**Secular Equilibrium PRG for Pb-212*	***1.03E-02***
**Secular Equilibrium PRG for Pb-214*	***1.09E-04***
**Secular Equilibrium PRG for Ra-228*	***2.03E-04***
**Secular Equilibrium PRG for Sr-90*	***3.95E-03***
**Secular Equilibrium PRG for Tl-208*	***-***
**Secular Equilibrium PRG for U-235*	***3.85E-04***

age-adjusted subsistence fisherman
shellfish

ATTACHMENT C

PROUCL OUTPUTS AND VI OUTPUTS

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ATTACHMENT C.1

PROUCL

Site Soils

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.111/15/2017 1:07:32 PM								
5	From File			Soil540-Peck Soils=0-0.5_Formatted_Data.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	**Val_ALUMINUM_FUME_OR_DUST**											
12												
13	**General Statistics**											
14	Total Number of Observations			77			Number of Distinct Observations				70	
15							Number of Missing Observations				0	
16	Minimum			3550			Mean				26484	
17	Maximum			1240000			Median				9315	
18	SD			140218			Std. Error of Mean				15979	
19	Coefficient of Variation			5.294			Skewness				8.755	
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic			0.138			**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk P Value			0			Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic			0.471			**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value			0.101			Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL			53092			95% Adjusted-CLT UCL (Chen-1995)				69802	
31							95% Modified-t UCL (Johnson-1978)				55749	
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic			16.94			**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value			0.805			Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic			0.356			**Kolmogorov-Smirnov Gamma GOF Test**					
37	5% K-S Critical Value			0.107			Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)			0.634			k star (bias corrected MLE)				0.618	
42	Theta hat (MLE)			41766			Theta star (bias corrected MLE)				42850	
43	nu hat (MLE)			97.65			nu star (bias corrected)				95.18	
44	MLE Mean (bias corrected)			26484			MLE Sd (bias corrected)				33687	
45							Approximate Chi Square Value (0.05)				73.68	
46	Adjusted Level of Significance			0.0469			Adjusted Chi Square Value				73.32	
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))			34213			95% Adjusted Gamma UCL (use when n<50)				34380	
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic			0.711			**Shapiro Wilk Lognormal GOF Test**					
53	5% Shapiro Wilk P Value			0			Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic			0.161			**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value			0.101			Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data			8.175			Mean of logged Data				9.218	
60	Maximum of Logged Data			14.03			SD of logged Data				0.713	
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL			15289			90% Chebyshev (MVUE) UCL				16418	
64	95% Chebyshev (MVUE) UCL			17996			97.5% Chebyshev (MVUE) UCL				20186	
65	99% Chebyshev (MVUE) UCL			24487								
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL			52767			95% Jackknife UCL				53092	
72	95% Standard Bootstrap UCL			52658			95% Bootstrap-t UCL				527648	
73	95% Hall's Bootstrap UCL			186482			95% Percentile Bootstrap UCL				58446	
74	95% BCA Bootstrap UCL			74438								
75	90% Chebyshev(Mean, Sd) UCL			74422			95% Chebyshev(Mean, Sd) UCL				96136	
76	97.5% Chebyshev(Mean, Sd) UCL			126274			99% Chebyshev(Mean, Sd) UCL				185476	
77												
78	**Suggested UCL to Use**											
79	95% Chebyshev (Mean, Sd) UCL			96136								
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											

Recommendations are based upon data size, data distribution, and skewness.				
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).				
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.				
Val_ANTIMONY				
General Statistics				
Total Number of Observations	77	Number of Distinct Observations	60	
Number of Detects	44	Number of Non-Detects	33	
Number of Distinct Detects	43	Number of Distinct Non-Detects	19	
Minimum Detect	0.52	Minimum Non-Detect	6.5	
Maximum Detect	1850	Maximum Non-Detect	11.1	
Variance Detects	76343	Percent Non-Detects	42.86%	
Mean Detects	66.59	SD Detects	276.3	
Median Detects	18.5	CV Detects	4.15	
Skewness Detects	6.545	Kurtosis Detects	43.19	
Mean of Logged Detects	2.712	SD of Logged Detects	1.477	
Normal GOF Test on Detects Only				
Shapiro Wilk Test Statistic	0.216	**Shapiro Wilk GOF Test**		
5% Shapiro Wilk Critical Value	0.944	Detected Data Not Normal at 5% Significance Level		
Lilliefors Test Statistic	0.425	**Lilliefors GOF Test**		
5% Lilliefors Critical Value	0.132	Detected Data Not Normal at 5% Significance Level		
Detected Data Not Normal at 5% Significance Level				
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs				
KM Mean	39.43	KM Standard Error of Mean	24.08	
KM SD	208.8	95% KM (BCA) UCL	89.88	
95% KM (t) UCL	79.52	95% KM (Percentile Bootstrap) UCL	86.45	
95% KM (z) UCL	79.03	95% KM Bootstrap t UCL	339	
90% KM Chebyshev UCL	111.7	95% KM Chebyshev UCL	144.4	
97.5% KM Chebyshev UCL	189.8	99% KM Chebyshev UCL	279	
Gamma GOF Tests on Detected Observations Only				
A-D Test Statistic	3.733	**Anderson-Darling GOF Test**		
5% A-D Critical Value	0.829	Detected Data Not Gamma Distributed at 5% Significance Level		
K-S Test Statistic	0.226	**Kolmogorov-Smirnov GOF**		
5% K-S Critical Value	0.142	Detected Data Not Gamma Distributed at 5% Significance Level		
Detected Data Not Gamma Distributed at 5% Significance Level				
Gamma Statistics on Detected Data Only				
k hat (MLE)	0.437	k star (bias corrected MLE)	0.422	
Theta hat (MLE)	152.5	Theta star (bias corrected MLE)	157.8	
nu hat (MLE)	38.41	nu star (bias corrected)	37.13	
Mean (detects)	66.59			
Gamma ROS Statistics using Imputed Non-Detects				
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs				
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)				
For such situations, GROS method may yield incorrect values of UCLs and BTVs				
This is especially true when the sample size is small.				
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates				
Minimum	0.01	Mean	38.05	
Maximum	1850	Median	2.7	
SD	210.5	CV	5.531	
k hat (MLE)	0.184	k star (bias corrected MLE)	0.185	
Theta hat (MLE)	207.3	Theta star (bias corrected MLE)	205.6	
nu hat (MLE)	28.27	nu star (bias corrected)	28.5	
Adjusted Level of Significance (β)	0.0469			
Approximate Chi Square Value (28.50, α)	17.32	Adjusted Chi Square Value (28.50, β)	17.15	
95% Gamma Approximate UCL (use when n>=50)	62.62	95% Gamma Adjusted UCL (use when n<50)	63.23	
Estimates of Gamma Parameters using KM Estimates				
Mean (KM)	39.43	SD (KM)	208.8	
Variance (KM)	43618	SE of Mean (KM)	24.08	
k hat (KM)	0.0356	k star (KM)	0.0429	
nu hat (KM)	5.488	nu star (KM)	6.608	
theta hat (KM)	1106	theta star (KM)	918.9	
80% gamma percentile (KM)	2.953	90% gamma percentile (KM)	48.16	
95% gamma percentile (KM)	196.4	99% gamma percentile (KM)	908.9	
Gamma Kaplan-Meier (KM) Statistics				
Approximate Chi Square Value (6.61, α)	1.958	Adjusted Chi Square Value (6.61, β)	1.91	
95% Gamma Approximate KM-UCL (use when n>=50)	133.1	95% Gamma Adjusted KM-UCL (use when n<50)	136.4	
Lognormal GOF Test on Detected Observations Only				
Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**		
5% Shapiro Wilk Critical Value	0.944	Detected Data appear Lognormal at 5% Significance Level		
Lilliefors Test Statistic	0.0827	**Lilliefors GOF Test**		
5% Lilliefors Critical Value	0.132	Detected Data appear Lognormal at 5% Significance Level		
Detected Data appear Lognormal at 5% Significance Level				

163												
164	**Lognormal ROS Statistics Using Imputed Non-Detects**											
165					Mean in Original Scale	39.34				Mean in Log Scale	1.974	
166					SD in Original Scale	210.2				SD in Log Scale	1.441	
167					95% t UCL (assumes normality of ROS data)	79.23				95% Percentile Bootstrap UCL	87.07	
168					95% BCA Bootstrap UCL	135				95% Bootstrap t UCL	345.2	
169					95% H-UCL (Log ROS)	31.96						
170												
171	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
172					KM Mean (logged)	1.955				KM Geo Mean	7.064	
173					KM SD (logged)	1.49				95% Critical H Value (KM-Log)	2.795	
174					KM Standard Error of Mean (logged)	0.201				95% H-UCL (KM -Log)	34.54	
175					KM SD (logged)	1.49				95% Critical H Value (KM-Log)	2.795	
176					KM Standard Error of Mean (logged)	0.201						
177												
178	**DL/2 Statistics**											
179	**DL/2 Normal**						**DL/2 Log-Transformed**					
180					Mean in Original Scale	39.66				Mean in Log Scale	2.115	
181					SD in Original Scale	210.2				SD in Log Scale	1.313	
182					95% t UCL (Assumes normality)	79.55				95% H-Stat UCL	28.97	
183	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
184												
185	**Nonparametric Distribution Free UCL Statistics**											
186	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
187												
188	**Suggested UCL to Use**											
189					KM H-UCL	34.54						
190												
191	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
192	Recommendations are based upon data size, data distribution, and skewness.											
193	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
194	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
195												
196												
197	**Val_ARSENIC**											
198												
199	**General Statistics**											
200					Total Number of Observations	77				Number of Distinct Observations	69	
201										Number of Missing Observations	0	
202					Minimum	0.64				Mean	11.58	
203					Maximum	96.75				Median	7.6	
204					SD	14.75				Std. Error of Mean	1.681	
205					Coefficient of Variation	1.274				Skewness	3.851	
206												
207	**Normal GOF Test**											
208					Shapiro Wilk Test Statistic	0.608	**Shapiro Wilk GOF Test**					
209					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
210					Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**					
211					5% Lilliefors Critical Value	0.101	Data Not Normal at 5% Significance Level					
212	**Data Not Normal at 5% Significance Level**											
213												
214	**Assuming Normal Distribution**											
215	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
216					95% Student's-t UCL	14.38				95% Adjusted-CLT UCL (Chen-1995)	15.13	
217										95% Modified-t UCL (Johnson-1978)	14.5	
218												
219	**Gamma GOF Test**											
220					A-D Test Statistic	1.392	**Anderson-Darling Gamma GOF Test**					
221					5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level					
222					K-S Test Statistic	0.131	**Kolmogorov-Smirnov Gamma GOF Test**					
223					5% K-S Critical Value	0.104	Data Not Gamma Distributed at 5% Significance Level					
224	**Data Not Gamma Distributed at 5% Significance Level**											
225												
226	**Gamma Statistics**											
227					k hat (MLE)	1.212				k star (bias corrected MLE)	1.174	
228					Theta hat (MLE)	9.548				Theta star (bias corrected MLE)	9.862	
229					nu hat (MLE)	186.7				nu star (bias corrected)	180.8	
230					MLE Mean (bias corrected)	11.58				MLE Sd (bias corrected)	10.69	
231										Approximate Chi Square Value (0.05)	150.7	
232					Adjusted Level of Significance	0.0469				Adjusted Chi Square Value	150.2	
233												
234	**Assuming Gamma Distribution**											
235					95% Approximate Gamma UCL (use when n>=50))	13.89				95% Adjusted Gamma UCL (use when n<50)	13.94	
236												
237	**Lognormal GOF Test**											
238					Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**					
239					5% Shapiro Wilk P Value	0.767	Data appear Lognormal at 5% Significance Level					
240					Lilliefors Test Statistic	0.0664	**Lilliefors Lognormal GOF Test**					
241					5% Lilliefors Critical Value	0.101	Data appear Lognormal at 5% Significance Level					
242	**Data appear Lognormal at 5% Significance Level**											
243												

	A	B	C	D	E	F	G	H	I	J	K	L
244	**Lognormal Statistics**											
245					Minimum of Logged Data	-0.446				Mean of logged Data		1.983
246					Maximum of Logged Data	4.572				SD of logged Data		0.959
247												
248	**Assuming Lognormal Distribution**											
249					95% H-UCL	14.69				90% Chebyshev (MVUE) UCL		15.81
250					95% Chebyshev (MVUE) UCL	17.81				97.5% Chebyshev (MVUE) UCL		20.58
251					99% Chebyshev (MVUE) UCL	26.02						
252												
253	**Nonparametric Distribution Free UCL Statistics**											
254	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
255												
256	**Nonparametric Distribution Free UCLs**											
257					95% CLT UCL	14.34				95% Jackknife UCL		14.38
258					95% Standard Bootstrap UCL	14.38				95% Bootstrap-t UCL		16.2
259					95% Hall's Bootstrap UCL	17.77				95% Percentile Bootstrap UCL		14.56
260					95% BCA Bootstrap UCL	15.14						
261					90% Chebyshev(Mean, Sd) UCL	16.62				95% Chebyshev(Mean, Sd) UCL		18.91
262					97.5% Chebyshev(Mean, Sd) UCL	22.08				99% Chebyshev(Mean, Sd) UCL		28.31
263												
264	**Suggested UCL to Use**											
265					95% H-UCL	14.69						
266												
267	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
268	Recommendations are based upon data size, data distribution, and skewness.											
269	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
270	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
271												
272	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
273	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
274	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
275	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
276												
277												
278	**Val_BARIUM**											
279												
280	**General Statistics**											
281					Total Number of Observations	77				Number of Distinct Observations		74
282										Number of Missing Observations		0
283					Minimum	27.1				Mean		269.3
284					Maximum	1950				Median		129
285					SD	321.1				Std. Error of Mean		36.59
286					Coefficient of Variation	1.192				Skewness		2.651
287												
288	**Normal GOF Test**											
289					Shapiro Wilk Test Statistic	0.71				**Shapiro Wilk GOF Test**		
290					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
291					Lilliefors Test Statistic	0.225				**Lilliefors GOF Test**		
292					5% Lilliefors Critical Value	0.101				Data Not Normal at 5% Significance Level		
293	**Data Not Normal at 5% Significance Level**											
294												
295	**Assuming Normal Distribution**											
296	**95% Normal UCL**									**95% UCLs (Adjusted for Skewness)**		
297					95% Student's-t UCL	330.2				95% Adjusted-CLT UCL (Chen-1995)		341.2
298										95% Modified-t UCL (Johnson-1978)		332
299												
300	**Gamma GOF Test**											
301					A-D Test Statistic	2.316				**Anderson-Darling Gamma GOF Test**		
302					5% A-D Critical Value	0.779				Data Not Gamma Distributed at 5% Significance Level		
303					K-S Test Statistic	0.143				**Kolmogorov-Smirnov Gamma GOF Test**		
304					5% K-S Critical Value	0.105				Data Not Gamma Distributed at 5% Significance Level		
305	**Data Not Gamma Distributed at 5% Significance Level**											
306												
307	**Gamma Statistics**											
308					k hat (MLE)	1.096				k star (bias corrected MLE)		1.062
309					Theta hat (MLE)	245.7				Theta star (bias corrected MLE)		253.6
310					nu hat (MLE)	168.8				nu star (bias corrected)		163.5
311					MLE Mean (bias corrected)	269.3				MLE Sd (bias corrected)		261.3
312										Approximate Chi Square Value (0.05)		135
313					Adjusted Level of Significance	0.0469				Adjusted Chi Square Value		134.5
314												
315	**Assuming Gamma Distribution**											
316					95% Approximate Gamma UCL (use when n>=50))	326.3				95% Adjusted Gamma UCL (use when n<50)		327.4
317												
318	**Lognormal GOF Test**											
319					Shapiro Wilk Test Statistic	0.952				**Shapiro Wilk Lognormal GOF Test**		
320					5% Shapiro Wilk P Value	0.015				Data Not Lognormal at 5% Significance Level		
321					Lilliefors Test Statistic	0.118				**Lilliefors Lognormal GOF Test**		
322					5% Lilliefors Critical Value	0.101				Data Not Lognormal at 5% Significance Level		
323	**Data Not Lognormal at 5% Significance Level**											
324												

	A	B	C	D	E	F	G	H	I	J	K	L
325	**Lognormal Statistics**											
326					Minimum of Logged Data	3.3				Mean of logged Data		5.074
327					Maximum of Logged Data	7.576				SD of logged Data		1.004
328												
329	**Assuming Lognormal Distribution**											
330					95% H-UCL	343.7				90% Chebyshev (MVUE) UCL		369.6
331					95% Chebyshev (MVUE) UCL	418.2				97.5% Chebyshev (MVUE) UCL		485.7
332					99% Chebyshev (MVUE) UCL	618.4						
333												
334	**Nonparametric Distribution Free UCL Statistics**											
335	**Data do not follow a Discernible Distribution (0.05)**											
336												
337	**Nonparametric Distribution Free UCLs**											
338					95% CLT UCL	329.4				95% Jackknife UCL		330.2
339					95% Standard Bootstrap UCL	329.9				95% Bootstrap-t UCL		345.8
340					95% Hall's Bootstrap UCL	351.3				95% Percentile Bootstrap UCL		332.5
341					95% BCA Bootstrap UCL	344						
342					90% Chebyshev(Mean, Sd) UCL	379				95% Chebyshev(Mean, Sd) UCL		428.7
343					97.5% Chebyshev(Mean, Sd) UCL	497.7				99% Chebyshev(Mean, Sd) UCL		633.3
344												
345	**Suggested UCL to Use**											
346					95% Chebyshev (Mean, Sd) UCL	428.7						
347												
348	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
349	Recommendations are based upon data size, data distribution, and skewness.											
350	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
351	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
352												
353	**Val_CADMIUM**											
354												
355	**General Statistics**											
356					Total Number of Observations	77				Number of Distinct Observations		70
357					Number of Detects	72				Number of Non-Detects		5
358					Number of Distinct Detects	66				Number of Distinct Non-Detects		4
359					Minimum Detect	0.3				Minimum Non-Detect		0.56
360					Maximum Detect	132				Maximum Non-Detect		0.64
361					Variance Detects	483.8				Percent Non-Detects		6.494%
362					Mean Detects	16.02				SD Detects		21.99
363					Median Detects	7.725				CV Detects		1.373
364					Skewness Detects	2.908				Kurtosis Detects		11.09
365					Mean of Logged Detects	1.956				SD of Logged Detects		1.397
366												
367	**Normal GOF Test on Detects Only**											
368					Shapiro Wilk Test Statistic	0.69				**Normal GOF Test on Detected Observations Only**		
369					5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level		
370					Lilliefors Test Statistic	0.237				**Lilliefors GOF Test**		
371					5% Lilliefors Critical Value	0.104				Detected Data Not Normal at 5% Significance Level		
372	**Detected Data Not Normal at 5% Significance Level**											
373												
374	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
375					KM Mean	15				KM Standard Error of Mean		2.464
376					KM SD	21.47				95% KM (BCA) UCL		19.28
377					95% KM (t) UCL	19.1				95% KM (Percentile Bootstrap) UCL		19.11
378					95% KM (z) UCL	19.05				95% KM Bootstrap t UCL		20.32
379					90% KM Chebyshev UCL	22.39				95% KM Chebyshev UCL		25.74
380					97.5% KM Chebyshev UCL	30.39				99% KM Chebyshev UCL		39.52
381												
382	**Gamma GOF Tests on Detected Observations Only**											
383					A-D Test Statistic	0.766				**Anderson-Darling GOF Test**		
384					5% A-D Critical Value	0.794				Detected data appear Gamma Distributed at 5% Significance Level		
385					K-S Test Statistic	0.104				**Kolmogorov-Smirnov GOF**		
386					5% K-S Critical Value	0.109				Detected data appear Gamma Distributed at 5% Significance Level		
387	**Detected data appear Gamma Distributed at 5% Significance Level**											
388												
389	**Gamma Statistics on Detected Data Only**											
390					k hat (MLE)	0.734				k star (bias corrected MLE)		0.713
391					Theta hat (MLE)	21.82				Theta star (bias corrected MLE)		22.47
392					nu hat (MLE)	105.7				nu star (bias corrected)		102.6
393					Mean (detects)	16.02						
394												
395	**Gamma ROS Statistics using Imputed Non-Detects**											
396	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
397	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
398	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
399	This is especially true when the sample size is small.											
400	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
401					Minimum	0.01				Mean		14.98
402					Maximum	132				Median		6
403					SD	21.63				CV		1.444
404					k hat (MLE)	0.534				k star (bias corrected MLE)		0.522
405					Theta hat (MLE)	28.03				Theta star (bias corrected MLE)		28.69

	A	B	C	D	E	F	G	H	I	J	K	L
406					nu hat (MLE)	82.28				nu star (bias corrected)		80.41
407					Adjusted Level of Significance (β)	0.0469						
408					Approximate Chi Square Value (80.41, α)	60.74				Adjusted Chi Square Value (80.41, β)		60.42
409				95% Gamma Approximate UCL (use when n>=50)		19.83				95% Gamma Adjusted UCL (use when n<50)		19.93
410												
411	**Estimates of Gamma Parameters using KM Estimates**											
412					Mean (KM)	15				SD (KM)		21.47
413					Variance (KM)	460.9				SE of Mean (KM)		2.464
414					k hat (KM)	0.488				k star (KM)		0.478
415					nu hat (KM)	75.19				nu star (KM)		73.59
416					theta hat (KM)	30.73				theta star (KM)		31.39
417					80% gamma percentile (KM)	24.58				90% gamma percentile (KM)		40.96
418					95% gamma percentile (KM)	58.56				99% gamma percentile (KM)		102
419												
420	**Gamma Kaplan-Meier (KM) Statistics**											
421					Approximate Chi Square Value (73.59, α)	54.84				Adjusted Chi Square Value (73.59, β)		54.53
422				95% Gamma Approximate KM-UCL (use when n>=50)		20.13				95% Gamma Adjusted KM-UCL (use when n<50)		20.25
423												
424	**Lognormal GOF Test on Detected Observations Only**											
425					Shapiro Wilk Approximate Test Statistic	0.972				**Shapiro Wilk GOF Test**		
426					5% Shapiro Wilk P Value	0.308				Detected Data appear Lognormal at 5% Significance Level		
427					Lilliefors Test Statistic	0.0861				**Lilliefors GOF Test**		
428					5% Lilliefors Critical Value	0.104				Detected Data appear Lognormal at 5% Significance Level		
429	**Detected Data appear Lognormal at 5% Significance Level**											
430												
431	**Lognormal ROS Statistics Using Imputed Non-Detects**											
432					Mean in Original Scale	15.01				Mean in Log Scale		1.773
433					SD in Original Scale	21.61				SD in Log Scale		1.521
434					95% t UCL (assumes normality of ROS data)	19.11				95% Percentile Bootstrap UCL		19.3
435					95% BCA Bootstrap UCL	19.79				95% Bootstrap t UCL		20.57
436					95% H-UCL (Log ROS)	30.68						
437												
438	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
439					KM Mean (logged)	1.763				KM Geo Mean		5.832
440					KM SD (logged)	1.529				95% Critical H Value (KM-Log)		2.842
441					KM Standard Error of Mean (logged)	0.176				95% H-UCL (KM -Log)		30.89
442					KM SD (logged)	1.529				95% Critical H Value (KM-Log)		2.842
443					KM Standard Error of Mean (logged)	0.176						
444												
445	**DL/2 Statistics**											
446	**DL/2 Normal**						**DL/2 Log-Transformed**					
447					Mean in Original Scale	15				Mean in Log Scale		1.752
448					SD in Original Scale	21.61				SD in Log Scale		1.56
449					95% t UCL (Assumes normality)	19.1				95% H-Stat UCL		32.55
450	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
451												
452	**Nonparametric Distribution Free UCL Statistics**											
453	**Detected Data appear Gamma Distributed at 5% Significance Level**											
454												
455	**Suggested UCL to Use**											
456					95% KM Approximate Gamma UCL	20.13						
457												
458	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
459	Recommendations are based upon data size, data distribution, and skewness.											
460	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
461	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
462												
463												
464	**Val_CHROMIUM**											
465												
466	**General Statistics**											
467					Total Number of Observations	77				Number of Distinct Observations		75
468										Number of Missing Observations		0
469					Minimum	9.1				Mean		283.1
470					Maximum	8150				Median		112
471					SD	936.7				Std. Error of Mean		106.7
472					Coefficient of Variation	3.309				Skewness		8.017
473												
474	**Normal GOF Test**											
475					Shapiro Wilk Test Statistic	0.264				**Shapiro Wilk GOF Test**		
476					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
477					Lilliefors Test Statistic	0.385				**Lilliefors GOF Test**		
478					5% Lilliefors Critical Value	0.101				Data Not Normal at 5% Significance Level		
479	**Data Not Normal at 5% Significance Level**											
480												
481	**Assuming Normal Distribution**											
482	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
483					95% Student's-t UCL	460.9				95% Adjusted-CLT UCL (Chen-1995)		562.9
484										95% Modified-t UCL (Johnson-1978)		477.1
485												
486	**Gamma GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
487					A-D Test Statistic	3.154	**Anderson-Darling Gamma GOF Test**					
488					5% A-D Critical Value	0.812	Data Not Gamma Distributed at 5% Significance Level					
489					K-S Test Statistic	0.14	**Kolmogorov-Smirnov Gamma GOF Test**					
490					5% K-S Critical Value	0.107	Data Not Gamma Distributed at 5% Significance Level					
491	**Data Not Gamma Distributed at 5% Significance Level**											
492												
493	**Gamma Statistics**											
494					k hat (MLE)	0.558			k star (bias corrected MLE)	0.545		
495					Theta hat (MLE)	507.4			Theta star (bias corrected MLE)	519.6		
496					nu hat (MLE)	85.92			nu star (bias corrected)	83.91		
497					MLE Mean (bias corrected)	283.1			MLE Sd (bias corrected)	383.5		
498									Approximate Chi Square Value (0.05)	63.8		
499					Adjusted Level of Significance	0.0469			Adjusted Chi Square Value	63.46		
500												
501	**Assuming Gamma Distribution**											
502				95% Approximate Gamma UCL (use when n>=50))		372.4			95% Adjusted Gamma UCL (use when n<50)	374.3		
503												
504	**Lognormal GOF Test**											
505					Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**					
506					5% Shapiro Wilk P Value	0.103	Data appear Lognormal at 5% Significance Level					
507					Lilliefors Test Statistic	0.0737	**Lilliefors Lognormal GOF Test**					
508					5% Lilliefors Critical Value	0.101	Data appear Lognormal at 5% Significance Level					
509	**Data appear Lognormal at 5% Significance Level**											
510												
511	**Lognormal Statistics**											
512					Minimum of Logged Data	2.208			Mean of logged Data	4.526		
513					Maximum of Logged Data	9.006			SD of logged Data	1.371		
514												
515	**Assuming Lognormal Distribution**											
516					95% H-UCL	359.4			90% Chebyshev (MVUE) UCL	374.6		
517					95% Chebyshev (MVUE) UCL	439.5			97.5% Chebyshev (MVUE) UCL	529.5		
518					99% Chebyshev (MVUE) UCL	706.5						
519												
520	**Nonparametric Distribution Free UCL Statistics**											
521	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
522												
523	**Nonparametric Distribution Free UCLs**											
524					95% CLT UCL	458.7			95% Jackknife UCL	460.9		
525					95% Standard Bootstrap UCL	454			95% Bootstrap-t UCL	961.2		
526					95% Hall's Bootstrap UCL	1100			95% Percentile Bootstrap UCL	498		
527					95% BCA Bootstrap UCL	621.3						
528					90% Chebyshev(Mean, Sd) UCL	603.4			95% Chebyshev(Mean, Sd) UCL	748.4		
529					97.5% Chebyshev(Mean, Sd) UCL	949.8			99% Chebyshev(Mean, Sd) UCL	1345		
530												
531	**Suggested UCL to Use**											
532					95% H-UCL	359.4						
533												
534	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
535	Recommendations are based upon data size, data distribution, and skewness.											
536	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
537	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
538												
539	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
540	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
541	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
542	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
543												
544	**Val_CHROMIUM_HEXAVALENT_COMPOUNDS**											
545												
546	**General Statistics**											
547					Total Number of Observations	15			Number of Distinct Observations	13		
548					Number of Detects	10			Number of Non-Detects	5		
549					Number of Distinct Detects	10			Number of Distinct Non-Detects	4		
550					Minimum Detect	0.49			Minimum Non-Detect	0.43		
551					Maximum Detect	47.4			Maximum Non-Detect	0.58		
552					Variance Detects	216.7			Percent Non-Detects	33.33%		
553					Mean Detects	5.511			SD Detects	14.72		
554					Median Detects	0.91			CV Detects	2.671		
555					Skewness Detects	3.161			Kurtosis Detects	9.992		
556					Mean of Logged Detects	0.209			SD of Logged Detects	1.316		
557												
558	**Normal GOF Test on Detects Only**											
559					Shapiro Wilk Test Statistic	0.381	**Shapiro Wilk GOF Test**					
560					5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level					
561					Lilliefors Test Statistic	0.512	**Lilliefors GOF Test**					
562					5% Lilliefors Critical Value	0.262	Detected Data Not Normal at 5% Significance Level					
563	**Detected Data Not Normal at 5% Significance Level**											
564												
565	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
566					KM Mean	3.82			KM Standard Error of Mean	3.171		
567					KM SD	11.65			95% KM (BCA) UCL	10.13		

568					95% KM (t) UCL	9.404			95% KM (Percentile Bootstrap) UCL			10.04
569					95% KM (z) UCL	9.035			95% KM Bootstrap t UCL			173.8
570					90% KM Chebyshev UCL	13.33			95% KM Chebyshev UCL			17.64
571					97.5% KM Chebyshev UCL	23.62			99% KM Chebyshev UCL			35.37
572												
573	**Gamma GOF Tests on Detected Observations Only**											
574					A-D Test Statistic	2.634	**Anderson-Darling GOF Test**					
575					5% A-D Critical Value	0.789	Detected Data Not Gamma Distributed at 5% Significance Level					
576					K-S Test Statistic	0.49	**Kolmogorov-Smirnov GOF**					
577					5% K-S Critical Value	0.283	Detected Data Not Gamma Distributed at 5% Significance Level					
578	**Detected Data Not Gamma Distributed at 5% Significance Level**											
579												
580	**Gamma Statistics on Detected Data Only**											
581					k hat (MLE)	0.434			k star (bias corrected MLE)			0.37
582					Theta hat (MLE)	12.71			Theta star (bias corrected MLE)			14.89
583					nu hat (MLE)	8.673			nu star (bias corrected)			7.404
584					Mean (detects)	5.511						
585												
586	**Gamma ROS Statistics using Imputed Non-Detects**											
587	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
588	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
589	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
590	This is especially true when the sample size is small.											
591	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
592					Minimum	0.01			Mean			3.677
593					Maximum	47.4			Median			0.68
594					SD	12.1			CV			3.291
595					k hat (MLE)	0.261			k star (bias corrected MLE)			0.254
596					Theta hat (MLE)	14.07			Theta star (bias corrected MLE)			14.5
597					nu hat (MLE)	7.841			nu star (bias corrected)			7.606
598					Adjusted Level of Significance (β)	0.0324						
599					Approximate Chi Square Value (7.61, α)	2.509			Adjusted Chi Square Value (7.61, β)			2.164
600					95% Gamma Approximate UCL (use when n>=50)	11.15			95% Gamma Adjusted UCL (use when n<50)			12.93
601												
602	**Estimates of Gamma Parameters using KM Estimates**											
603					Mean (KM)	3.82			SD (KM)			11.65
604					Variance (KM)	135.7			SE of Mean (KM)			3.171
605					k hat (KM)	0.107			k star (KM)			0.13
606					nu hat (KM)	3.224			nu star (KM)			3.913
607					theta hat (KM)	35.54			theta star (KM)			29.28
608					80% gamma percentile (KM)	3.661			90% gamma percentile (KM)			11.05
609					95% gamma percentile (KM)	21.54			99% gamma percentile (KM)			52.94
610												
611	**Gamma Kaplan-Meier (KM) Statistics**											
612					Approximate Chi Square Value (3.91, α)	0.688			Adjusted Chi Square Value (3.91, β)			0.544
613					95% Gamma Approximate KM-UCL (use when n>=50)	21.74			95% Gamma Adjusted KM-UCL (use when n<50)			27.49
614												
615	**Lognormal GOF Test on Detected Observations Only**											
616					Shapiro Wilk Test Statistic	0.586	**Shapiro Wilk GOF Test**					
617					5% Shapiro Wilk Critical Value	0.842	Detected Data Not Lognormal at 5% Significance Level					
618					Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**					
619					5% Lilliefors Critical Value	0.262	Detected Data Not Lognormal at 5% Significance Level					
620	**Detected Data Not Lognormal at 5% Significance Level**											
621												
622	**Lognormal ROS Statistics Using Imputed Non-Detects**											
623					Mean in Original Scale	3.711			Mean in Log Scale			-0.604
624					SD in Original Scale	12.09			SD in Log Scale			1.601
625					95% t UCL (assumes normality of ROS data)	9.211			95% Percentile Bootstrap UCL			9.937
626					95% BCA Bootstrap UCL	13.13			95% Bootstrap t UCL			111.8
627					95% H-UCL (Log ROS)	10.01						
628												
629	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
630					KM Mean (logged)	-0.138			KM Geo Mean			0.871
631					KM SD (logged)	1.131			95% Critical H Value (KM-Log)			2.958
632					KM Standard Error of Mean (logged)	0.308			95% H-UCL (KM -Log)			4.042
633					KM SD (logged)	1.131			95% Critical H Value (KM-Log)			2.958
634					KM Standard Error of Mean (logged)	0.308						
635												
636	**DL/2 Statistics**											
637	**DL/2 Normal**						**DL/2 Log-Transformed**					
638					Mean in Original Scale	3.755			Mean in Log Scale			-0.333
639					SD in Original Scale	12.08			SD in Log Scale			1.321
640					95% t UCL (Assumes normality)	9.249			95% H-Stat UCL			5.475
641	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
642												
643	**Nonparametric Distribution Free UCL Statistics**											
644	**Data do not follow a Discernible Distribution at 5% Significance Level**											
645												
646	**Suggested UCL to Use**											
647					95% KM (Chebyshev) UCL	17.64						
648												

	A	B	C	D	E	F	G	H	I	J	K	L
649	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
650	Recommendations are based upon data size, data distribution, and skewness.											
651	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
652	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
653												
654	**Val_COBALT**											
655												
656	**General Statistics**											
657						Total Number of Observations	77				Number of Distinct Observations	70
658						Number of Detects	63				Number of Non-Detects	14
659						Number of Distinct Detects	61				Number of Distinct Non-Detects	10
660						Minimum Detect	3.4				Minimum Non-Detect	5.7
661						Maximum Detect	5430				Maximum Non-Detect	9.2
662						Variance Detects	494102				Percent Non-Detects	18.18%
663						Mean Detects	182.5				SD Detects	702.9
664						Median Detects	43.9				CV Detects	3.851
665						Skewness Detects	7.02				Kurtosis Detects	52.18
666						Mean of Logged Detects	3.814				SD of Logged Detects	1.361
667												
668	**Normal GOF Test on Detects Only**											
669						Shapiro Wilk Test Statistic	0.249				**Normal GOF Test on Detected Observations Only**	
670						5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level	
671						Lilliefors Test Statistic	0.427				**Lilliefors GOF Test**	
672						5% Lilliefors Critical Value	0.111				Detected Data Not Normal at 5% Significance Level	
673	**Detected Data Not Normal at 5% Significance Level**											
674												
675	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
676						KM Mean	150				KM Standard Error of Mean	72.89
677						KM SD	634.5				95% KM (BCA) UCL	289.4
678						95% KM (t) UCL	271.4				95% KM (Percentile Bootstrap) UCL	289.6
679						95% KM (z) UCL	269.9				95% KM Bootstrap t UCL	1007
680						90% KM Chebyshev UCL	368.7				95% KM Chebyshev UCL	467.7
681						97.5% KM Chebyshev UCL	605.2				99% KM Chebyshev UCL	875.3
682												
683	**Gamma GOF Tests on Detected Observations Only**											
684						A-D Test Statistic	5.873				**Anderson-Darling GOF Test**	
685						5% A-D Critical Value	0.825				Detected Data Not Gamma Distributed at 5% Significance Level	
686						K-S Test Statistic	0.22				**Kolmogorov-Smirnov GOF**	
687						5% K-S Critical Value	0.119				Detected Data Not Gamma Distributed at 5% Significance Level	
688	**Detected Data Not Gamma Distributed at 5% Significance Level**											
689												
690	**Gamma Statistics on Detected Data Only**											
691						k hat (MLE)	0.462				k star (bias corrected MLE)	0.45
692						Theta hat (MLE)	395.5				Theta star (bias corrected MLE)	405.5
693						nu hat (MLE)	58.16				nu star (bias corrected)	56.72
694						Mean (detects)	182.5					
695												
696	**Gamma ROS Statistics using Imputed Non-Detects**											
697	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
698	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
699	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
700	This is especially true when the sample size is small.											
701	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
702						Minimum	0.01				Mean	149.4
703						Maximum	5430				Median	29.6
704						SD	638.8				CV	4.277
705						k hat (MLE)	0.259				k star (bias corrected MLE)	0.258
706						Theta hat (MLE)	576				Theta star (bias corrected MLE)	579.3
707						nu hat (MLE)	39.93				nu star (bias corrected)	39.71
708						Adjusted Level of Significance (β)	0.0469					
709						Approximate Chi Square Value (39.71, α)	26.27				Adjusted Chi Square Value (39.71, β)	26.06
710						95% Gamma Approximate UCL (use when n>=50)	225.7				95% Gamma Adjusted UCL (use when n<50)	227.5
711												
712	**Estimates of Gamma Parameters using KM Estimates**											
713						Mean (KM)	150				SD (KM)	634.5
714						Variance (KM)	402606				SE of Mean (KM)	72.89
715						k hat (KM)	0.0559				k star (KM)	0.0624
716						nu hat (KM)	8.609				nu star (KM)	9.607
717						theta hat (KM)	2684				theta star (KM)	2405
718						80% gamma percentile (KM)	40.31				90% gamma percentile (KM)	293.1
719						95% gamma percentile (KM)	847.6				99% gamma percentile (KM)	2976
720												
721	**Gamma Kaplan-Meier (KM) Statistics**											
722						Approximate Chi Square Value (9.61, α)	3.698				Adjusted Chi Square Value (9.61, β)	3.628
723						95% Gamma Approximate KM-UCL (use when n>=50)	389.8				95% Gamma Adjusted KM-UCL (use when n<50)	397.3
724												
725	**Lognormal GOF Test on Detected Observations Only**											
726						Shapiro Wilk Approximate Test Statistic	0.958				**Shapiro Wilk GOF Test**	
727						5% Shapiro Wilk P Value	0.0734				Detected Data appear Lognormal at 5% Significance Level	
728						Lilliefors Test Statistic	0.07				**Lilliefors GOF Test**	
729						5% Lilliefors Critical Value	0.111				Detected Data appear Lognormal at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
730	**Detected Data appear Lognormal at 5% Significance Level**											
731												
732	**Lognormal ROS Statistics Using Imputed Non-Detects**											
733					Mean in Original Scale	149.9			Mean in Log Scale	3.329		
734					SD in Original Scale	638.7			SD in Log Scale	1.612		
735					95% t UCL (assumes normality of ROS data)	271.1			95% Percentile Bootstrap UCL	279.3		
736					95% BCA Bootstrap UCL	411.8			95% Bootstrap t UCL	600.6		
737					95% H-UCL (Log ROS)	176.2						
738												
739	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
740					KM Mean (logged)	3.355			KM Geo Mean	28.66		
741					KM SD (logged)	1.563			95% Critical H Value (KM-Log)	2.883		
742					KM Standard Error of Mean (logged)	0.18			95% H-UCL (KM -Log)	163		
743					KM SD (logged)	1.563			95% Critical H Value (KM-Log)	2.883		
744					KM Standard Error of Mean (logged)	0.18						
745												
746	**DL/2 Statistics**											
747	**DL/2 Normal**							**DL/2 Log-Transformed**				
748					Mean in Original Scale	149.9			Mean in Log Scale	3.334		
749					SD in Original Scale	638.7			SD in Log Scale	1.601		
750					95% t UCL (Assumes normality)	271.1			95% H-Stat UCL	173		
751	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
752												
753	**Nonparametric Distribution Free UCL Statistics**											
754	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
755												
756	**Suggested UCL to Use**											
757					KM H-UCL	163						
758												
759	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
760	Recommendations are based upon data size, data distribution, and skewness.											
761	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
762	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
763												
764												
765	**Val_COPPER**											
766												
767	**General Statistics**											
768					Total Number of Observations	77			Number of Distinct Observations	74		
769									Number of Missing Observations	0		
770					Minimum	11.9			Mean	3806		
771					Maximum	183000			Median	476		
772					SD	20800			Std. Error of Mean	2370		
773					Coefficient of Variation	5.465			Skewness	8.635		
774												
775	**Normal GOF Test**											
776					Shapiro Wilk Test Statistic	0.172			**Shapiro Wilk GOF Test**			
777					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
778					Lilliefors Test Statistic	0.428			**Lilliefors GOF Test**			
779					5% Lilliefors Critical Value	0.101			Data Not Normal at 5% Significance Level			
780	**Data Not Normal at 5% Significance Level**											
781												
782	**Assuming Normal Distribution**											
783	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
784					95% Student's-t UCL	7753			95% Adjusted-CLT UCL (Chen-1995)	10197		
785									95% Modified-t UCL (Johnson-1978)	8142		
786												
787	**Gamma GOF Test**											
788					A-D Test Statistic	4.86			**Anderson-Darling Gamma GOF Test**			
789					5% A-D Critical Value	0.861			Data Not Gamma Distributed at 5% Significance Level			
790					K-S Test Statistic	0.182			**Kolmogorov-Smirnov Gamma GOF Test**			
791					5% K-S Critical Value	0.11			Data Not Gamma Distributed at 5% Significance Level			
792	**Data Not Gamma Distributed at 5% Significance Level**											
793												
794	**Gamma Statistics**											
795					k hat (MLE)	0.316			k star (bias corrected MLE)	0.312		
796					Theta hat (MLE)	12058			Theta star (bias corrected MLE)	12198		
797					nu hat (MLE)	48.61			nu star (bias corrected)	48.05		
798					MLE Mean (bias corrected)	3806			MLE Sd (bias corrected)	6814		
799									Approximate Chi Square Value (0.05)	33.14		
800					Adjusted Level of Significance	0.0469			Adjusted Chi Square Value	32.9		
801												
802	**Assuming Gamma Distribution**											
803					95% Approximate Gamma UCL (use when n>=50))	5518			95% Adjusted Gamma UCL (use when n<50)	5558		
804												
805	**Lognormal GOF Test**											
806					Shapiro Wilk Test Statistic	0.967			**Shapiro Wilk Lognormal GOF Test**			
807					5% Shapiro Wilk P Value	0.145			Data appear Lognormal at 5% Significance Level			
808					Lilliefors Test Statistic	0.0593			**Lilliefors Lognormal GOF Test**			
809					5% Lilliefors Critical Value	0.101			Data appear Lognormal at 5% Significance Level			
810	**Data appear Lognormal at 5% Significance Level**											

811												
812	**Lognormal Statistics**											
813					Minimum of Logged Data	2.477			Mean of logged Data	6.078		
814					Maximum of Logged Data	12.12			SD of logged Data	1.971		
815												
816	**Assuming Lognormal Distribution**											
817					95% H-UCL	6543			90% Chebyshev (MVUE) UCL	5756		
818					95% Chebyshev (MVUE) UCL	7079			97.5% Chebyshev (MVUE) UCL	8916		
819					99% Chebyshev (MVUE) UCL	12523						
820												
821	**Nonparametric Distribution Free UCL Statistics**											
822	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
823												
824	**Nonparametric Distribution Free UCLs**											
825					95% CLT UCL	7705			95% Jackknife UCL	7753		
826					95% Standard Bootstrap UCL	7665			95% Bootstrap-t UCL	35604		
827					95% Hall's Bootstrap UCL	22341			95% Percentile Bootstrap UCL	8498		
828					95% BCA Bootstrap UCL	13328						
829					90% Chebyshev(Mean, Sd) UCL	10917			95% Chebyshev(Mean, Sd) UCL	14138		
830					97.5% Chebyshev(Mean, Sd) UCL	18609			99% Chebyshev(Mean, Sd) UCL	27391		
831												
832	**Suggested UCL to Use**											
833					95% H-UCL	6543						
834												
835	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
836	Recommendations are based upon data size, data distribution, and skewness.											
837	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
838	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
839												
840	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
841	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
842	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
843	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
844												
845												
846	**Val_IRON**											
847												
848	**General Statistics**											
849					Total Number of Observations	77			Number of Distinct Observations	72		
850									Number of Missing Observations	0		
851					Minimum	3560			Mean	72285		
852					Maximum	1580000			Median	26300		
853					SD	185446			Std. Error of Mean	21134		
854					Coefficient of Variation	2.566			Skewness	7.308		
855												
856	**Normal GOF Test**											
857					Shapiro Wilk Test Statistic	0.338			**Shapiro Wilk GOF Test**			
858					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
859					Lilliefors Test Statistic	0.355			**Lilliefors GOF Test**			
860					5% Lilliefors Critical Value	0.101			Data Not Normal at 5% Significance Level			
861	**Data Not Normal at 5% Significance Level**											
862												
863	**Assuming Normal Distribution**											
864	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
865					95% Student's-t UCL	107475			95% Adjusted-CLT UCL (Chen-1995)	125853		
866									95% Modified-t UCL (Johnson-1978)	110409		
867												
868	**Gamma GOF Test**											
869					A-D Test Statistic	3.67			**Anderson-Darling Gamma GOF Test**			
870					5% A-D Critical Value	0.798			Data Not Gamma Distributed at 5% Significance Level			
871					K-S Test Statistic	0.155			**Kolmogorov-Smirnov Gamma GOF Test**			
872					5% K-S Critical Value	0.106			Data Not Gamma Distributed at 5% Significance Level			
873	**Data Not Gamma Distributed at 5% Significance Level**											
874												
875	**Gamma Statistics**											
876					k hat (MLE)	0.702			k star (bias corrected MLE)	0.683		
877					Theta hat (MLE)	103010			Theta star (bias corrected MLE)	105828		
878					nu hat (MLE)	108.1			nu star (bias corrected)	105.2		
879					MLE Mean (bias corrected)	72285			MLE Sd (bias corrected)	87463		
880									Approximate Chi Square Value (0.05)	82.52		
881					Adjusted Level of Significance	0.0469			Adjusted Chi Square Value	82.14		
882												
883	**Assuming Gamma Distribution**											
884					95% Approximate Gamma UCL (use when n>=50))	92140			95% Adjusted Gamma UCL (use when n<50)	92568		
885												
886	**Lognormal GOF Test**											
887					Shapiro Wilk Test Statistic	0.956			**Shapiro Wilk Lognormal GOF Test**			
888					5% Shapiro Wilk P Value	0.03			Data Not Lognormal at 5% Significance Level			
889					Lilliefors Test Statistic	0.101			**Lilliefors Lognormal GOF Test**			
890					5% Lilliefors Critical Value	0.101			Data Not Lognormal at 5% Significance Level			
891	**Data Not Lognormal at 5% Significance Level**											

892												
893	**Lognormal Statistics**											
894					Minimum of Logged Data	8.178				Mean of logged Data	10.33	
895					Maximum of Logged Data	14.27				SD of logged Data	1.165	
896												
897	**Assuming Lognormal Distribution**											
898					95% H-UCL	83316				90% Chebyshev (MVUE) UCL	88856	
899					95% Chebyshev (MVUE) UCL	102218				97.5% Chebyshev (MVUE) UCL	120765	
900					99% Chebyshev (MVUE) UCL	157196						
901												
902	**Nonparametric Distribution Free UCL Statistics**											
903	**Data do not follow a Discernible Distribution (0.05)**											
904												
905	**Nonparametric Distribution Free UCLs**											
906					95% CLT UCL	107046				95% Jackknife UCL	107475	
907					95% Standard Bootstrap UCL	106173				95% Bootstrap-t UCL	169974	
908					95% Hall's Bootstrap UCL	235333				95% Percentile Bootstrap UCL	110412	
909					95% BCA Bootstrap UCL	138613						
910					90% Chebyshev(Mean, Sd) UCL	135685				95% Chebyshev(Mean, Sd) UCL	164404	
911					97.5% Chebyshev(Mean, Sd) UCL	204264				99% Chebyshev(Mean, Sd) UCL	282561	
912												
913	**Suggested UCL to Use**											
914					95% Chebyshev (Mean, Sd) UCL	164404						
915												
916	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
917	Recommendations are based upon data size, data distribution, and skewness.											
918	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
919	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
920												
921												
922	**Val_LEAD**											
923												
924	**General Statistics**											
925					Total Number of Observations	77				Number of Distinct Observations	77	
926										Number of Missing Observations	0	
927					Minimum	19.5				Mean	2793	
928					Maximum	121000				Median	450	
929					SD	13785				Std. Error of Mean	1571	
930					Coefficient of Variation	4.935				Skewness	8.519	
931												
932	**Normal GOF Test**											
933					Shapiro Wilk Test Statistic	0.189				**Shapiro Wilk GOF Test**		
934					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
935					Lilliefors Test Statistic	0.42				**Lilliefors GOF Test**		
936					5% Lilliefors Critical Value	0.101				Data Not Normal at 5% Significance Level		
937	**Data Not Normal at 5% Significance Level**											
938												
939	**Assuming Normal Distribution**											
940					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
941					95% Student's-t UCL	5409				95% Adjusted-CLT UCL (Chen-1995)	7007	
942										95% Modified-t UCL (Johnson-1978)	5663	
943												
944	**Gamma GOF Test**											
945					A-D Test Statistic	4.8				**Anderson-Darling Gamma GOF Test**		
946					5% A-D Critical Value	0.849				Data Not Gamma Distributed at 5% Significance Level		
947					K-S Test Statistic	0.172				**Kolmogorov-Smirnov Gamma GOF Test**		
948					5% K-S Critical Value	0.11				Data Not Gamma Distributed at 5% Significance Level		
949	**Data Not Gamma Distributed at 5% Significance Level**											
950												
951	**Gamma Statistics**											
952					k hat (MLE)	0.369				k star (bias corrected MLE)	0.364	
953					Theta hat (MLE)	7561				Theta star (bias corrected MLE)	7680	
954					nu hat (MLE)	56.89				nu star (bias corrected)	56	
955					MLE Mean (bias corrected)	2793				MLE Sd (bias corrected)	4632	
956										Approximate Chi Square Value (0.05)	39.81	
957					Adjusted Level of Significance	0.0469				Adjusted Chi Square Value	39.55	
958												
959	**Assuming Gamma Distribution**											
960					95% Approximate Gamma UCL (use when n>=50))	3930				95% Adjusted Gamma UCL (use when n<50)	3956	
961												
962	**Lognormal GOF Test**											
963					Shapiro Wilk Test Statistic	0.972				**Shapiro Wilk Lognormal GOF Test**		
964					5% Shapiro Wilk P Value	0.289				Data appear Lognormal at 5% Significance Level		
965					Lilliefors Test Statistic	0.0497				**Lilliefors Lognormal GOF Test**		
966					5% Lilliefors Critical Value	0.101				Data appear Lognormal at 5% Significance Level		
967	**Data appear Lognormal at 5% Significance Level**											
968												
969	**Lognormal Statistics**											
970					Minimum of Logged Data	2.97				Mean of logged Data	6.13	
971					Maximum of Logged Data	11.7				SD of logged Data	1.733	
972												

973	**Assuming Lognormal Distribution**											
974					95% H-UCL	3812			90% Chebyshev (MVUE) UCL	3661		
975					95% Chebyshev (MVUE) UCL	4427			97.5% Chebyshev (MVUE) UCL	5491		
976					99% Chebyshev (MVUE) UCL	7580						
977												
978	**Nonparametric Distribution Free UCL Statistics**											
979	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
980												
981	**Nonparametric Distribution Free UCLs**											
982					95% CLT UCL	5377			95% Jackknife UCL	5409		
983					95% Standard Bootstrap UCL	5252			95% Bootstrap-t UCL	21504		
984					95% Hall's Bootstrap UCL	15242			95% Percentile Bootstrap UCL	5883		
985					95% BCA Bootstrap UCL	8865						
986					90% Chebyshev(Mean, Sd) UCL	7506			95% Chebyshev(Mean, Sd) UCL	9641		
987					97.5% Chebyshev(Mean, Sd) UCL	12604			99% Chebyshev(Mean, Sd) UCL	18424		
988												
989	**Suggested UCL to Use**											
990					95% H-UCL	3812						
991												
992	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
993	Recommendations are based upon data size, data distribution, and skewness.											
994	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
995	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
996												
997	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
998	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
999	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1000	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1001												
1002												
1003	**Val_MANGANESE**											
1004												
1005	**General Statistics**											
1006					Total Number of Observations	77			Number of Distinct Observations	75		
1007									Number of Missing Observations	0		
1008					Minimum	14.9			Mean	490.3		
1009					Maximum	1860			Median	292		
1010					SD	471			Std. Error of Mean	53.67		
1011					Coefficient of Variation	0.961			Skewness	1.405		
1012												
1013	**Normal GOF Test**											
1014					Shapiro Wilk Test Statistic	0.794			**Shapiro Wilk GOF Test**			
1015					5% Shapiro Wilk P Value	3.886E-15			Data Not Normal at 5% Significance Level			
1016					Lilliefors Test Statistic	0.234			**Lilliefors GOF Test**			
1017					5% Lilliefors Critical Value	0.101			Data Not Normal at 5% Significance Level			
1018	**Data Not Normal at 5% Significance Level**											
1019												
1020	**Assuming Normal Distribution**											
1021					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1022					95% Student's-t UCL	579.6			95% Adjusted-CLT UCL (Chen-1995)	587.7		
1023									95% Modified-t UCL (Johnson-1978)	581.1		
1024												
1025	**Gamma GOF Test**											
1026					A-D Test Statistic	1.293			**Anderson-Darling Gamma GOF Test**			
1027					5% A-D Critical Value	0.776			Data Not Gamma Distributed at 5% Significance Level			
1028					K-S Test Statistic	0.139			**Kolmogorov-Smirnov Gamma GOF Test**			
1029					5% K-S Critical Value	0.104			Data Not Gamma Distributed at 5% Significance Level			
1030	**Data Not Gamma Distributed at 5% Significance Level**											
1031												
1032	**Gamma Statistics**											
1033					k hat (MLE)	1.251			k star (bias corrected MLE)	1.211		
1034					Theta hat (MLE)	392			Theta star (bias corrected MLE)	405		
1035					nu hat (MLE)	192.6			nu star (bias corrected)	186.4		
1036					MLE Mean (bias corrected)	490.3			MLE Sd (bias corrected)	445.6		
1037									Approximate Chi Square Value (0.05)	155.9		
1038					Adjusted Level of Significance	0.0469			Adjusted Chi Square Value	155.3		
1039												
1040	**Assuming Gamma Distribution**											
1041					95% Approximate Gamma UCL (use when n>=50))	586.5			95% Adjusted Gamma UCL (use when n<50)	588.5		
1042												
1043	**Lognormal GOF Test**											
1044					Shapiro Wilk Test Statistic	0.966			**Shapiro Wilk Lognormal GOF Test**			
1045					5% Shapiro Wilk P Value	0.128			Data appear Lognormal at 5% Significance Level			
1046					Lilliefors Test Statistic	0.0748			**Lilliefors Lognormal GOF Test**			
1047					5% Lilliefors Critical Value	0.101			Data appear Lognormal at 5% Significance Level			
1048	**Data appear Lognormal at 5% Significance Level**											
1049												
1050	**Lognormal Statistics**											
1051					Minimum of Logged Data	2.701			Mean of logged Data	5.745		
1052					Maximum of Logged Data	7.528			SD of logged Data	1.009		
1053												

	A	B	C	D	E	F	G	H	I	J	K	L
1054	**Assuming Lognormal Distribution**											
1055					95% H-UCL	676.4			90% Chebyshev (MVUE) UCL	727.2		
1056					95% Chebyshev (MVUE) UCL	823.4			97.5% Chebyshev (MVUE) UCL	956.9		
1057					99% Chebyshev (MVUE) UCL	1219						
1058												
1059	**Nonparametric Distribution Free UCL Statistics**											
1060	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1061												
1062	**Nonparametric Distribution Free UCLs**											
1063					95% CLT UCL	578.5			95% Jackknife UCL	579.6		
1064					95% Standard Bootstrap UCL	578.7			95% Bootstrap-t UCL	591.8		
1065					95% Hall's Bootstrap UCL	586.6			95% Percentile Bootstrap UCL	581.7		
1066					95% BCA Bootstrap UCL	586.9						
1067					90% Chebyshev(Mean, Sd) UCL	651.3			95% Chebyshev(Mean, Sd) UCL	724.2		
1068					97.5% Chebyshev(Mean, Sd) UCL	825.4			99% Chebyshev(Mean, Sd) UCL	1024		
1069												
1070	**Suggested UCL to Use**											
1071					95% H-UCL	676.4						
1072												
1073	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1074	Recommendations are based upon data size, data distribution, and skewness.											
1075	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1076	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1077												
1078	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
1079	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
1080	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1081	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1082												
1083	**Val_MERCURY**											
1084												
1085	**General Statistics**											
1086					Total Number of Observations	75			Number of Distinct Observations	64		
1087					Number of Detects	71			Number of Non-Detects	4		
1088					Number of Distinct Detects	63			Number of Distinct Non-Detects	2		
1089					Minimum Detect	0.017			Minimum Non-Detect	0.13		
1090					Maximum Detect	29.4			Maximum Non-Detect	0.14		
1091					Variance Detects	25.04			Percent Non-Detects	5.333%		
1092					Mean Detects	3.089			SD Detects	5.004		
1093					Median Detects	1			CV Detects	1.62		
1094					Skewness Detects	2.877			Kurtosis Detects	10.69		
1095					Mean of Logged Detects	-0.0825			SD of Logged Detects	1.739		
1096												
1097	**Normal GOF Test on Detects Only**											
1098					Shapiro Wilk Test Statistic	0.646			**Normal GOF Test on Detected Observations Only**			
1099					5% Shapiro Wilk P Value	0			Detected Data Not Normal at 5% Significance Level			
1100					Lilliefors Test Statistic	0.278			**Lilliefors GOF Test**			
1101					5% Lilliefors Critical Value	0.105			Detected Data Not Normal at 5% Significance Level			
1102	**Detected Data Not Normal at 5% Significance Level**											
1103												
1104	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1105					KM Mean	2.928			KM Standard Error of Mean	0.568		
1106					KM SD	4.881			95% KM (BCA) UCL	3.903		
1107					95% KM (t) UCL	3.873			95% KM (Percentile Bootstrap) UCL	3.881		
1108					95% KM (z) UCL	3.862			95% KM Bootstrap t UCL	4.219		
1109					90% KM Chebyshev UCL	4.631			95% KM Chebyshev UCL	5.402		
1110					97.5% KM Chebyshev UCL	6.473			99% KM Chebyshev UCL	8.576		
1111												
1112	**Gamma GOF Tests on Detected Observations Only**											
1113					A-D Test Statistic	1.454			**Anderson-Darling GOF Test**			
1114					5% A-D Critical Value	0.815			Detected Data Not Gamma Distributed at 5% Significance Level			
1115					K-S Test Statistic	0.145			**Kolmogorov-Smirnov GOF**			
1116					5% K-S Critical Value	0.112			Detected Data Not Gamma Distributed at 5% Significance Level			
1117	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1118												
1119	**Gamma Statistics on Detected Data Only**											
1120					k hat (MLE)	0.521			k star (bias corrected MLE)	0.509		
1121					Theta hat (MLE)	5.923			Theta star (bias corrected MLE)	6.07		
1122					nu hat (MLE)	74.05			nu star (bias corrected)	72.26		
1123					Mean (detects)	3.089						
1124												
1125	**Gamma ROS Statistics using Imputed Non-Detects**											
1126	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1127	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1128	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1129	This is especially true when the sample size is small.											
1130	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1131					Minimum	0.01			Mean	2.924		
1132					Maximum	29.4			Median	0.975		
1133					SD	4.916			CV	1.681		
1134					k hat (MLE)	0.461			k star (bias corrected MLE)	0.451		

	A	B	C	D	E	F	G	H	I	J	K	L
1135	Theta hat (MLE)					6.348	Theta star (bias corrected MLE)					6.483
1136	nu hat (MLE)					69.1	nu star (bias corrected)					67.66
1137	Adjusted Level of Significance (β)					0.0468						
1138	Approximate Chi Square Value (67.66, α)					49.73	Adjusted Chi Square Value (67.66, β)					49.43
1139	95% Gamma Approximate UCL (use when n>=50)					3.979	95% Gamma Adjusted UCL (use when n<50)					4.003
1140												
1141	**Estimates of Gamma Parameters using KM Estimates**											
1142	Mean (KM)					2.928	SD (KM)					4.881
1143	Variance (KM)					23.83	SE of Mean (KM)					0.568
1144	k hat (KM)					0.36	k star (KM)					0.354
1145	nu hat (KM)					53.97	nu star (KM)					53.14
1146	theta hat (KM)					8.138	theta star (KM)					8.264
1147	80% gamma percentile (KM)					4.646	90% gamma percentile (KM)					8.439
1148	95% gamma percentile (KM)					12.68	99% gamma percentile (KM)					23.49
1149												
1150	**Gamma Kaplan-Meier (KM) Statistics**											
1151	Approximate Chi Square Value (53.14, α)					37.4	Adjusted Chi Square Value (53.14, β)					37.14
1152	95% Gamma Approximate KM-UCL (use when n>=50)					4.161	95% Gamma Adjusted KM-UCL (use when n<50)					4.19
1153												
1154	**Lognormal GOF Test on Detected Observations Only**											
1155	Shapiro Wilk Approximate Test Statistic					0.97	**Shapiro Wilk GOF Test**					
1156	5% Shapiro Wilk P Value					0.241	Detected Data appear Lognormal at 5% Significance Level					
1157	Lilliefors Test Statistic					0.0761	**Lilliefors GOF Test**					
1158	5% Lilliefors Critical Value					0.105	Detected Data appear Lognormal at 5% Significance Level					
1159	**Detected Data appear Lognormal at 5% Significance Level**											
1160												
1161	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1162	Mean in Original Scale					2.928	Mean in Log Scale					-0.219
1163	SD in Original Scale					4.914	SD in Log Scale					1.789
1164	95% t UCL (assumes normality of ROS data)					3.873	95% Percentile Bootstrap UCL					3.895
1165	95% BCA Bootstrap UCL					4.144	95% Bootstrap t UCL					4.164
1166	95% H-UCL (Log ROS)					7.678						
1167												
1168	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1169	KM Mean (logged)					-0.225	KM Geo Mean					0.798
1170	KM SD (logged)					1.791	95% Critical H Value (KM-Log)					3.155
1171	KM Standard Error of Mean (logged)					0.209	95% H-UCL (KM -Log)					7.658
1172	KM SD (logged)					1.791	95% Critical H Value (KM-Log)					3.155
1173	KM Standard Error of Mean (logged)					0.209						
1174												
1175	**DL/2 Statistics**											
1176	**DL/2 Normal**						**DL/2 Log-Transformed**					
1177	Mean in Original Scale					2.927	Mean in Log Scale					-0.221
1178	SD in Original Scale					4.914	SD in Log Scale					1.79
1179	95% t UCL (Assumes normality)					3.873	95% H-Stat UCL					7.671
1180	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1181												
1182	**Nonparametric Distribution Free UCL Statistics**											
1183	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
1184												
1185	**Suggested UCL to Use**											
1186	KM H-UCL					7.658						
1187												
1188	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1189	Recommendations are based upon data size, data distribution, and skewness.											
1190	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1191	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1192												
1193	**Val_NICKEL**											
1194												
1195	**General Statistics**											
1196	Total Number of Observations					77	Number of Distinct Observations					77
1197	Number of Detects					76	Number of Non-Detects					1
1198	Number of Distinct Detects					76	Number of Distinct Non-Detects					1
1199	Minimum Detect					5.9	Minimum Non-Detect					5.4
1200	Maximum Detect					3250	Maximum Non-Detect					5.4
1201	Variance Detects					186556	Percent Non-Detects					1.299%
1202	Mean Detects					255	SD Detects					431.9
1203	Median Detects					125.5	CV Detects					1.694
1204	Skewness Detects					4.871	Kurtosis Detects					31.02
1205	Mean of Logged Detects					4.593	SD of Logged Detects					1.512
1206												
1207	**Normal GOF Test on Detects Only**											
1208	Shapiro Wilk Test Statistic					0.555	**Normal GOF Test on Detected Observations Only**					
1209	5% Shapiro Wilk P Value					0	Detected Data Not Normal at 5% Significance Level					
1210	Lilliefors Test Statistic					0.282	**Lilliefors GOF Test**					
1211	5% Lilliefors Critical Value					0.102	Detected Data Not Normal at 5% Significance Level					
1212	**Detected Data Not Normal at 5% Significance Level**											
1213												
1214	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1215	KM Mean					251.7	KM Standard Error of Mean					49.01

	A	B	C	D	E	F	G	H	I	J	K	L
1216					KM SD	427.2				95% KM (BCA) UCL		345.7
1217					95% KM (t) UCL	333.3				95% KM (Percentile Bootstrap) UCL		336.6
1218					95% KM (z) UCL	332.4				95% KM Bootstrap t UCL		393.2
1219					90% KM Chebyshev UCL	398.8				95% KM Chebyshev UCL		465.4
1220					97.5% KM Chebyshev UCL	557.8				99% KM Chebyshev UCL		739.4
1221												
1222					**Gamma GOF Tests on Detected Observations Only**							
1223					A-D Test Statistic	0.863	**Anderson-Darling GOF Test**					
1224					5% A-D Critical Value	0.803	Detected Data Not Gamma Distributed at 5% Significance Level					
1225					K-S Test Statistic	0.094	**Kolmogorov-Smirnov GOF**					
1226					5% K-S Critical Value	0.107	Detected data appear Gamma Distributed at 5% Significance Level					
1227					**Detected data follow Appr. Gamma Distribution at 5% Significance Level**							
1228												
1229					**Gamma Statistics on Detected Data Only**							
1230					k hat (MLE)	0.645	k star (bias corrected MLE)					0.628
1231					Theta hat (MLE)	395.3	Theta star (bias corrected MLE)					405.8
1232					nu hat (MLE)	98.05	nu star (bias corrected)					95.51
1233					Mean (detects)	255						
1234												
1235					**Gamma ROS Statistics using Imputed Non-Detects**							
1236					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1237					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1238					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1239					This is especially true when the sample size is small.							
1240					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1241					Minimum	0.01	Mean					251.7
1242					Maximum	3250	Median					123
1243					SD	430.1	CV					1.709
1244					k hat (MLE)	0.588	k star (bias corrected MLE)					0.574
1245					Theta hat (MLE)	428.1	Theta star (bias corrected MLE)					438.7
1246					nu hat (MLE)	90.54	nu star (bias corrected)					88.34
1247					Adjusted Level of Significance (β)	0.0469						
1248					Approximate Chi Square Value (88.34, α)	67.67	Adjusted Chi Square Value (88.34, β)					67.33
1249					95% Gamma Approximate UCL (use when n>=50)	328.5	95% Gamma Adjusted UCL (use when n<50)					330.2
1250												
1251					**Estimates of Gamma Parameters using KM Estimates**							
1252					Mean (KM)	251.7	SD (KM)					427.2
1253					Variance (KM)	182509	SE of Mean (KM)					49.01
1254					k hat (KM)	0.347	k star (KM)					0.342
1255					nu hat (KM)	53.47	nu star (KM)					52.72
1256					theta hat (KM)	725	theta star (KM)					735.3
1257					80% gamma percentile (KM)	397.1	90% gamma percentile (KM)					729.4
1258					95% gamma percentile (KM)	1103	99% gamma percentile (KM)					2058
1259												
1260					**Gamma Kaplan-Meier (KM) Statistics**							
1261					Approximate Chi Square Value (52.72, α)	37.04	Adjusted Chi Square Value (52.72, β)					36.79
1262					95% Gamma Approximate KM-UCL (use when n>=50)	358.3	95% Gamma Adjusted KM-UCL (use when n<50)					360.7
1263												
1264					**Lognormal GOF Test on Detected Observations Only**							
1265					Shapiro Wilk Approximate Test Statistic	0.952	**Shapiro Wilk GOF Test**					
1266					5% Shapiro Wilk P Value	0.0153	Detected Data Not Lognormal at 5% Significance Level					
1267					Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**					
1268					5% Lilliefors Critical Value	0.102	Detected Data Not Lognormal at 5% Significance Level					
1269					**Detected Data Not Lognormal at 5% Significance Level**							
1270												
1271					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1272					Mean in Original Scale	251.7	Mean in Log Scale					4.541
1273					SD in Original Scale	430	SD in Log Scale					1.571
1274					95% t UCL (assumes normality of ROS data)	333.3	95% Percentile Bootstrap UCL					337.7
1275					95% BCA Bootstrap UCL	359.6	95% Bootstrap t UCL					380.7
1276					95% H-UCL (Log ROS)	542.6						
1277												
1278					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1279					KM Mean (logged)	4.556	KM Geo Mean					95.17
1280					KM SD (logged)	1.528	95% Critical H Value (KM-Log)					2.841
1281					KM Standard Error of Mean (logged)	0.175	95% H-UCL (KM -Log)					503.5
1282					KM SD (logged)	1.528	95% Critical H Value (KM-Log)					2.841
1283					KM Standard Error of Mean (logged)	0.175						
1284												
1285					**DL/2 Statistics**							
1286					**DL/2 Normal**		**DL/2 Log-Transformed**					
1287					Mean in Original Scale	251.7	Mean in Log Scale					4.547
1288					SD in Original Scale	430	SD in Log Scale					1.557
1289					95% t UCL (Assumes normality)	333.3	95% H-Stat UCL					530
1290					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1291												
1292					**Nonparametric Distribution Free UCL Statistics**							
1293					**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**							
1294												
1295					**Suggested UCL to Use**							
1296					95% KM Approximate Gamma UCL	358.3						

1297												
1298	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
1299	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
1300												
1301	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1302	Recommendations are based upon data size, data distribution, and skewness.											
1303	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1304	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1305												
1306	**Val_SILVER**											
1307												
1308	**General Statistics**											
1309						Total Number of Observations	77			Number of Distinct Observations	25	
1310						Number of Detects	32			Number of Non-Detects	45	
1311						Number of Distinct Detects	24			Number of Distinct Non-Detects	6	
1312						Minimum Detect	0.063			Minimum Non-Detect	1.1	
1313						Maximum Detect	111			Maximum Non-Detect	1.7	
1314						Variance Detects	380.2			Percent Non-Detects	58.44%	
1315						Mean Detects	7.002			SD Detects	19.5	
1316						Median Detects	1.95			CV Detects	2.784	
1317						Skewness Detects	5.225			Kurtosis Detects	28.4	
1318						Mean of Logged Detects	0.933			SD of Logged Detects	1.231	
1319												
1320	**Normal GOF Test on Detects Only**											
1321						Shapiro Wilk Test Statistic	0.319			**Shapiro Wilk GOF Test**		
1322						5% Shapiro Wilk Critical Value	0.93			Detected Data Not Normal at 5% Significance Level		
1323						Lilliefors Test Statistic	0.376			**Lilliefors GOF Test**		
1324						5% Lilliefors Critical Value	0.154			Detected Data Not Normal at 5% Significance Level		
1325	**Detected Data Not Normal at 5% Significance Level**											
1326												
1327	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1328						KM Mean	3.26			KM Standard Error of Mean	1.487	
1329						KM SD	12.77			95% KM (BCA) UCL	5.974	
1330						95% KM (t) UCL	5.736			95% KM (Percentile Bootstrap) UCL	6.091	
1331						95% KM (z) UCL	5.706			95% KM Bootstrap t UCL	13.93	
1332						90% KM Chebyshev UCL	7.721			95% KM Chebyshev UCL	9.742	
1333						97.5% KM Chebyshev UCL	12.55			99% KM Chebyshev UCL	18.06	
1334												
1335	**Gamma GOF Tests on Detected Observations Only**											
1336						A-D Test Statistic	3.405			**Anderson-Darling GOF Test**		
1337						5% A-D Critical Value	0.801			Detected Data Not Gamma Distributed at 5% Significance Level		
1338						K-S Test Statistic	0.263			**Kolmogorov-Smirnov GOF**		
1339						5% K-S Critical Value	0.163			Detected Data Not Gamma Distributed at 5% Significance Level		
1340	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1341												
1342	**Gamma Statistics on Detected Data Only**											
1343						k hat (MLE)	0.609			k star (bias corrected MLE)	0.572	
1344						Theta hat (MLE)	11.5			Theta star (bias corrected MLE)	12.23	
1345						nu hat (MLE)	38.96			nu star (bias corrected)	36.64	
1346						Mean (detects)	7.002					
1347												
1348	**Gamma ROS Statistics using Imputed Non-Detects**											
1349	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1350	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1351	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1352	This is especially true when the sample size is small.											
1353	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1354						Minimum	0.01			Mean	2.916	
1355						Maximum	111			Median	0.01	
1356						SD	12.93			CV	4.433	
1357						k hat (MLE)	0.216			k star (bias corrected MLE)	0.216	
1358						Theta hat (MLE)	13.53			Theta star (bias corrected MLE)	13.51	
1359						nu hat (MLE)	33.2			nu star (bias corrected)	33.24	
1360						Adjusted Level of Significance (β)	0.0469					
1361						Approximate Chi Square Value (33.24, α)	21.06			Adjusted Chi Square Value (33.24, β)	20.87	
1362						95% Gamma Approximate UCL (use when n>=50)	4.603			95% Gamma Adjusted UCL (use when n<50)	4.644	
1363												
1364	**Estimates of Gamma Parameters using KM Estimates**											
1365						Mean (KM)	3.26			SD (KM)	12.77	
1366						Variance (KM)	163.1			SE of Mean (KM)	1.487	
1367						k hat (KM)	0.0652			k star (KM)	0.0713	
1368						nu hat (KM)	10.03			nu star (KM)	10.98	
1369						theta hat (KM)	50.04			theta star (KM)	45.74	
1370						80% gamma percentile (KM)	1.217			90% gamma percentile (KM)	7.133	
1371						95% gamma percentile (KM)	18.79			99% gamma percentile (KM)	60.93	
1372												
1373	**Gamma Kaplan-Meier (KM) Statistics**											
1374						Approximate Chi Square Value (10.98, α)	4.56			Adjusted Chi Square Value (10.98, β)	4.481	
1375						95% Gamma Approximate KM-UCL (use when n>=50)	7.846			95% Gamma Adjusted KM-UCL (use when n<50)	7.984	
1376												
1377	**Lognormal GOF Test on Detected Observations Only**											

	A	B	C	D	E	F	G	H	I	J	K	L
1378					Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**					
1379					5% Shapiro Wilk Critical Value	0.93	Detected Data Not Lognormal at 5% Significance Level					
1380					Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**					
1381					5% Lilliefors Critical Value	0.154	Detected Data Not Lognormal at 5% Significance Level					
1382	**Detected Data Not Lognormal at 5% Significance Level**											
1383												
1384	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1385					Mean in Original Scale	3.088				Mean in Log Scale	-0.528	
1386					SD in Original Scale	12.89				SD in Log Scale	1.642	
1387				95% t UCL (assumes normality of ROS data)		5.534				95% Percentile Bootstrap UCL	5.92	
1388					95% BCA Bootstrap UCL	7.762				95% Bootstrap t UCL	14.24	
1389					95% H-UCL (Log ROS)	3.976						
1390												
1391	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1392					KM Mean (logged)	-0.291				KM Geo Mean	0.747	
1393					KM SD (logged)	1.656				95% Critical H Value (KM-Log)	2.995	
1394					KM Standard Error of Mean (logged)	0.521				95% H-UCL (KM -Log)	5.2	
1395					KM SD (logged)	1.656				95% Critical H Value (KM-Log)	2.995	
1396					KM Standard Error of Mean (logged)	0.521						
1397												
1398	**DL/2 Statistics**											
1399	**DL/2 Normal**						**DL/2 Log-Transformed**					
1400					Mean in Original Scale	3.278				Mean in Log Scale	0.114	
1401					SD in Original Scale	12.85				SD in Log Scale	1.052	
1402					95% t UCL (Assumes normality)	5.716				95% H-Stat UCL	2.578	
1403	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1404												
1405	**Nonparametric Distribution Free UCL Statistics**											
1406	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1407												
1408	**Suggested UCL to Use**											
1409					95% KM (Chebyshev) UCL	9.742						
1410												
1411	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1412	Recommendations are based upon data size, data distribution, and skewness.											
1413	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1414	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1415												
1416												
1417	**Val_VANADIUM_FUME_OR_DUST**											
1418												
1419	**General Statistics**											
1420					Total Number of Observations	77				Number of Distinct Observations	72	
1421										Number of Missing Observations	0	
1422					Minimum	9				Mean	123	
1423					Maximum	1820				Median	34.6	
1424					SD	269.7				Std. Error of Mean	30.74	
1425					Coefficient of Variation	2.194				Skewness	4.33	
1426												
1427	**Normal GOF Test**											
1428					Shapiro Wilk Test Statistic	0.443	**Shapiro Wilk GOF Test**					
1429					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
1430					Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**					
1431					5% Lilliefors Critical Value	0.101	Data Not Normal at 5% Significance Level					
1432	**Data Not Normal at 5% Significance Level**											
1433												
1434	**Assuming Normal Distribution**											
1435	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1436					95% Student's-t UCL	174.1				95% Adjusted-CLT UCL (Chen-1995)	189.7	
1437										95% Modified-t UCL (Johnson-1978)	176.7	
1438												
1439	**Gamma GOF Test**											
1440					A-D Test Statistic	7.263	**Anderson-Darling Gamma GOF Test**					
1441					5% A-D Critical Value	0.802	Data Not Gamma Distributed at 5% Significance Level					
1442					K-S Test Statistic	0.211	**Kolmogorov-Smirnov Gamma GOF Test**					
1443					5% K-S Critical Value	0.106	Data Not Gamma Distributed at 5% Significance Level					
1444	**Data Not Gamma Distributed at 5% Significance Level**											
1445												
1446	**Gamma Statistics**											
1447					k hat (MLE)	0.66				k star (bias corrected MLE)	0.643	
1448					Theta hat (MLE)	186.2				Theta star (bias corrected MLE)	191.2	
1449					nu hat (MLE)	101.7				nu star (bias corrected)	99.06	
1450					MLE Mean (bias corrected)	123				MLE Sd (bias corrected)	153.3	
1451										Approximate Chi Square Value (0.05)	77.1	
1452					Adjusted Level of Significance	0.0469				Adjusted Chi Square Value	76.73	
1453												
1454	**Assuming Gamma Distribution**											
1455					95% Approximate Gamma UCL (use when n>=50))	158				95% Adjusted Gamma UCL (use when n<50)	158.7	
1456												
1457	**Lognormal GOF Test**											
1458					Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk Lognormal GOF Test**					

1459				5% Shapiro Wilk P Value	2.0482E-7	Data Not Lognormal at 5% Significance Level						
1460				Lilliefors Test Statistic	0.143	**Lilliefors Lognormal GOF Test**						
1461				5% Lilliefors Critical Value	0.101	Data Not Lognormal at 5% Significance Level						
1462	**Data Not Lognormal at 5% Significance Level**											
1463												
1464	**Lognormal Statistics**											
1465				Minimum of Logged Data	2.197	Mean of logged Data	3.889					
1466				Maximum of Logged Data	7.507	SD of logged Data	1.143					
1467												
1468	**Assuming Lognormal Distribution**											
1469				95% H-UCL	128.8	90% Chebyshev (MVUE) UCL	137.6					
1470				95% Chebyshev (MVUE) UCL	158	97.5% Chebyshev (MVUE) UCL	186.2					
1471				99% Chebyshev (MVUE) UCL	241.7							
1472												
1473	**Nonparametric Distribution Free UCL Statistics**											
1474	**Data do not follow a Discernible Distribution (0.05)**											
1475												
1476	**Nonparametric Distribution Free UCLs**											
1477				95% CLT UCL	173.5	95% Jackknife UCL	174.1					
1478				95% Standard Bootstrap UCL	173.1	95% Bootstrap-t UCL	211.6					
1479				95% Hall's Bootstrap UCL	204.6	95% Percentile Bootstrap UCL	179.1					
1480				95% BCA Bootstrap UCL	193.3							
1481				90% Chebyshev(Mean, Sd) UCL	215.2	95% Chebyshev(Mean, Sd) UCL	256.9					
1482				97.5% Chebyshev(Mean, Sd) UCL	314.9	99% Chebyshev(Mean, Sd) UCL	428.8					
1483												
1484	**Suggested UCL to Use**											
1485				95% Chebyshev (Mean, Sd) UCL	256.9							
1486												
1487	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1488	Recommendations are based upon data size, data distribution, and skewness.											
1489	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1490	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1491												
1492												
1493	**Val_ZINC**											
1494												
1495	**General Statistics**											
1496				Total Number of Observations	77	Number of Distinct Observations	74					
1497						Number of Missing Observations	0					
1498				Minimum	39.2	Mean	4576					
1499				Maximum	127000	Median	868					
1500				SD	14916	Std. Error of Mean	1700					
1501				Coefficient of Variation	3.259	Skewness	7.521					
1502												
1503	**Normal GOF Test**											
1504				Shapiro Wilk Test Statistic	0.3	**Shapiro Wilk GOF Test**						
1505				5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level						
1506				Lilliefors Test Statistic	0.38	**Lilliefors GOF Test**						
1507				5% Lilliefors Critical Value	0.101	Data Not Normal at 5% Significance Level						
1508	**Data Not Normal at 5% Significance Level**											
1509												
1510	**Assuming Normal Distribution**											
1511	**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**						
1512				95% Student's-t UCL	7407	95% Adjusted-CLT UCL (Chen-1995)	8929					
1513						95% Modified-t UCL (Johnson-1978)	7650					
1514												
1515	**Gamma GOF Test**											
1516				A-D Test Statistic	3.187	**Anderson-Darling Gamma GOF Test**						
1517				5% A-D Critical Value	0.833	Data Not Gamma Distributed at 5% Significance Level						
1518				K-S Test Statistic	0.167	**Kolmogorov-Smirnov Gamma GOF Test**						
1519				5% K-S Critical Value	0.108	Data Not Gamma Distributed at 5% Significance Level						
1520	**Data Not Gamma Distributed at 5% Significance Level**											
1521												
1522	**Gamma Statistics**											
1523				k hat (MLE)	0.439	k star (bias corrected MLE)	0.431					
1524				Theta hat (MLE)	10421	Theta star (bias corrected MLE)	10625					
1525				nu hat (MLE)	67.63	nu star (bias corrected)	66.33					
1526				MLE Mean (bias corrected)	4576	MLE Sd (bias corrected)	6973					
1527						Approximate Chi Square Value (0.05)	48.59					
1528				Adjusted Level of Significance	0.0469	Adjusted Chi Square Value	48.3					
1529												
1530	**Assuming Gamma Distribution**											
1531				95% Approximate Gamma UCL (use when n>=50))	6248	95% Adjusted Gamma UCL (use when n<50)	6285					
1532												
1533	**Lognormal GOF Test**											
1534				Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk Lognormal GOF Test**						
1535				5% Shapiro Wilk P Value	0.607	Data appear Lognormal at 5% Significance Level						
1536				Lilliefors Test Statistic	0.0638	**Lilliefors Lognormal GOF Test**						
1537				5% Lilliefors Critical Value	0.101	Data appear Lognormal at 5% Significance Level						
1538	**Data appear Lognormal at 5% Significance Level**											
1539												

	A	B	C	D	E	F	G	H	I	J	K	L
1540	**Lognormal Statistics**											
1541					Minimum of Logged Data	3.669				Mean of logged Data		6.953
1542					Maximum of Logged Data	11.75				SD of logged Data		1.682
1543												
1544	**Assuming Lognormal Distribution**											
1545					95% H-UCL	7723				90% Chebyshev (MVUE) UCL		7528
1546					95% Chebyshev (MVUE) UCL	9068				97.5% Chebyshev (MVUE) UCL		11206
1547					99% Chebyshev (MVUE) UCL	15405						
1548												
1549	**Nonparametric Distribution Free UCL Statistics**											
1550	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1551												
1552	**Nonparametric Distribution Free UCLs**											
1553					95% CLT UCL	7373				95% Jackknife UCL		7407
1554					95% Standard Bootstrap UCL	7406				95% Bootstrap-t UCL		13407
1555					95% Hall's Bootstrap UCL	17323				95% Percentile Bootstrap UCL		7708
1556					95% BCA Bootstrap UCL	9722						
1557					90% Chebyshev(Mean, Sd) UCL	9676				95% Chebyshev(Mean, Sd) UCL		11986
1558					97.5% Chebyshev(Mean, Sd) UCL	15192				99% Chebyshev(Mean, Sd) UCL		21490
1559												
1560	**Suggested UCL to Use**											
1561					95% H-UCL	7723						
1562												
1563	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1564	Recommendations are based upon data size, data distribution, and skewness.											
1565	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1566	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1567												
1568	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
1569	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
1570	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
1571	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
1572												
1573	**Val_BENZOAANTHRACENE**											
1574												
1575	**General Statistics**											
1576					Total Number of Observations	73				Number of Distinct Observations		42
1577					Number of Detects	59				Number of Non-Detects		14
1578					Number of Distinct Detects	41				Number of Distinct Non-Detects		6
1579					Minimum Detect	0.13				Minimum Non-Detect		0.18
1580					Maximum Detect	15.35				Maximum Non-Detect		0.25
1581					Variance Detects	5.38				Percent Non-Detects		19.18%
1582					Mean Detects	0.975				SD Detects		2.32
1583					Median Detects	0.32				CV Detects		2.378
1584					Skewness Detects	4.892				Kurtosis Detects		26.93
1585					Mean of Logged Detects	-0.866				SD of Logged Detects		1.013
1586												
1587	**Normal GOF Test on Detects Only**											
1588					Shapiro Wilk Test Statistic	0.384				**Normal GOF Test on Detected Observations Only**		
1589					5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level		
1590					Lilliefors Test Statistic	0.381				**Lilliefors GOF Test**		
1591					5% Lilliefors Critical Value	0.115				Detected Data Not Normal at 5% Significance Level		
1592	**Detected Data Not Normal at 5% Significance Level**											
1593												
1594	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1595					KM Mean	0.819				KM Standard Error of Mean		0.247
1596					KM SD	2.092				95% KM (BCA) UCL		1.254
1597					95% KM (t) UCL	1.23				95% KM (Percentile Bootstrap) UCL		1.278
1598					95% KM (z) UCL	1.225				95% KM Bootstrap t UCL		1.756
1599					90% KM Chebyshev UCL	1.56				95% KM Chebyshev UCL		1.895
1600					97.5% KM Chebyshev UCL	2.361				99% KM Chebyshev UCL		3.276
1601												
1602	**Gamma GOF Tests on Detected Observations Only**											
1603					A-D Test Statistic	7.577				**Anderson-Darling GOF Test**		
1604					5% A-D Critical Value	0.795				Detected Data Not Gamma Distributed at 5% Significance Level		
1605					K-S Test Statistic	0.304				**Kolmogorov-Smirnov GOF**		
1606					5% K-S Critical Value	0.121				Detected Data Not Gamma Distributed at 5% Significance Level		
1607	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1608												
1609	**Gamma Statistics on Detected Data Only**											
1610					k hat (MLE)	0.716				k star (bias corrected MLE)		0.691
1611					Theta hat (MLE)	1.362				Theta star (bias corrected MLE)		1.412
1612					nu hat (MLE)	84.49				nu star (bias corrected)		81.53
1613					Mean (detects)	0.975						
1614												
1615	**Gamma ROS Statistics using Imputed Non-Detects**											
1616	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1617	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1618	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1619	This is especially true when the sample size is small.											
1620	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											

	A	B	C	D	E	F	G	H	I	J	K	L
1621					Minimum	0.01					Mean	0.79
1622					Maximum	15.35					Median	0.28
1623					SD	2.117					CV	2.679
1624					k hat (MLE)	0.475					k star (bias corrected MLE)	0.465
1625					Theta hat (MLE)	1.664					Theta star (bias corrected MLE)	1.701
1626					nu hat (MLE)	69.35					nu star (bias corrected)	67.84
1627					Adjusted Level of Significance (β)	0.0467						
1628					Approximate Chi Square Value (67.84, α)	49.88					Adjusted Chi Square Value (67.84, β)	49.57
1629					95% Gamma Approximate UCL (use when n>=50)	1.075					95% Gamma Adjusted UCL (use when n<50)	1.081
1630												
1631					**Estimates of Gamma Parameters using KM Estimates**							
1632					Mean (KM)	0.819					SD (KM)	2.092
1633					Variance (KM)	4.378					SE of Mean (KM)	0.247
1634					k hat (KM)	0.153					k star (KM)	0.156
1635					nu hat (KM)	22.36					nu star (KM)	22.77
1636					theta hat (KM)	5.347					theta star (KM)	5.25
1637					80% gamma percentile (KM)	0.92					90% gamma percentile (KM)	2.44
1638					95% gamma percentile (KM)	4.472					99% gamma percentile (KM)	10.32
1639												
1640					**Gamma Kaplan-Meier (KM) Statistics**							
1641					Approximate Chi Square Value (22.77, α)	12.92					Adjusted Chi Square Value (22.77, β)	12.77
1642					95% Gamma Approximate KM-UCL (use when n>=50)	1.443					95% Gamma Adjusted KM-UCL (use when n<50)	1.46
1643												
1644					**Lognormal GOF Test on Detected Observations Only**							
1645					Shapiro Wilk Approximate Test Statistic	0.825					**Shapiro Wilk GOF Test**	
1646					5% Shapiro Wilk P Value	3.4285E-9					Detected Data Not Lognormal at 5% Significance Level	
1647					Lilliefors Test Statistic	0.185					**Lilliefors GOF Test**	
1648					5% Lilliefors Critical Value	0.115					Detected Data Not Lognormal at 5% Significance Level	
1649					**Detected Data Not Lognormal at 5% Significance Level**							
1650												
1651					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1652					Mean in Original Scale	0.811					Mean in Log Scale	-1.117
1653					SD in Original Scale	2.109					SD in Log Scale	1.055
1654					95% t UCL (assumes normality of ROS data)	1.223					95% Percentile Bootstrap UCL	1.243
1655					95% BCA Bootstrap UCL	1.42					95% Bootstrap t UCL	1.79
1656					95% H-UCL (Log ROS)	0.761						
1657												
1658					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1659					KM Mean (logged)	-1.054					KM Geo Mean	0.348
1660					KM SD (logged)	0.984					95% Critical H Value (KM-Log)	2.239
1661					KM Standard Error of Mean (logged)	0.116					95% H-UCL (KM -Log)	0.733
1662					KM SD (logged)	0.984					95% Critical H Value (KM-Log)	2.239
1663					KM Standard Error of Mean (logged)	0.116						
1664												
1665					**DL/2 Statistics**							
1666					**DL/2 Normal**						**DL/2 Log-Transformed**	
1667					Mean in Original Scale	0.808					Mean in Log Scale	-1.139
1668					SD in Original Scale	2.11					SD in Log Scale	1.07
1669					95% t UCL (Assumes normality)	1.219					95% H-Stat UCL	0.761
1670					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1671												
1672					**Nonparametric Distribution Free UCL Statistics**							
1673					**Data do not follow a Discernible Distribution at 5% Significance Level**							
1674												
1675					**Suggested UCL to Use**							
1676					95% KM (Chebyshev) UCL	1.895						
1677												
1678					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1679					Recommendations are based upon data size, data distribution, and skewness.							
1680					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
1681					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
1682												
1683	**Val_BENZOAPYRENE**											
1684												
1685					**General Statistics**							
1686					Total Number of Observations	73					Number of Distinct Observations	45
1687					Number of Detects	60					Number of Non-Detects	13
1688					Number of Distinct Detects	42					Number of Distinct Non-Detects	6
1689					Minimum Detect	0.12					Minimum Non-Detect	0.18
1690					Maximum Detect	12					Maximum Non-Detect	0.25
1691					Variance Detects	4.134					Percent Non-Detects	17.81%
1692					Mean Detects	0.911					SD Detects	2.033
1693					Median Detects	0.35					CV Detects	2.232
1694					Skewness Detects	4.347					Kurtosis Detects	19.81
1695					Mean of Logged Detects	-0.87					SD of Logged Detects	0.977
1696												
1697					**Normal GOF Test on Detects Only**							
1698					Shapiro Wilk Test Statistic	0.392					**Normal GOF Test on Detected Observations Only**	
1699					5% Shapiro Wilk P Value	0					Detected Data Not Normal at 5% Significance Level	
1700					Lilliefors Test Statistic	0.392					**Lilliefors GOF Test**	
1701					5% Lilliefors Critical Value	0.114					Detected Data Not Normal at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
1702	**Detected Data Not Normal at 5% Significance Level**											
1703												
1704	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1705	KM Mean					0.776	KM Standard Error of Mean					0.218
1706	KM SD					1.851	95% KM (BCA) UCL					1.202
1707	95% KM (t) UCL					1.14	95% KM (Percentile Bootstrap) UCL					1.171
1708	95% KM (z) UCL					1.135	95% KM Bootstrap t UCL					1.684
1709	90% KM Chebyshev UCL					1.431	95% KM Chebyshev UCL					1.728
1710	97.5% KM Chebyshev UCL					2.14	99% KM Chebyshev UCL					2.95
1711												
1712	**Gamma GOF Tests on Detected Observations Only**											
1713	A-D Test Statistic					7.557	**Anderson-Darling GOF Test**					
1714	5% A-D Critical Value					0.791	Detected Data Not Gamma Distributed at 5% Significance Level					
1715	K-S Test Statistic					0.296	**Kolmogorov-Smirnov GOF**					
1716	5% K-S Critical Value					0.119	Detected Data Not Gamma Distributed at 5% Significance Level					
1717	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1718												
1719	**Gamma Statistics on Detected Data Only**											
1720	k hat (MLE)					0.768	k star (bias corrected MLE)					0.74
1721	Theta hat (MLE)					1.187	Theta star (bias corrected MLE)					1.23
1722	nu hat (MLE)					92.12	nu star (bias corrected)					88.85
1723	Mean (detects)					0.911						
1724												
1725	**Gamma ROS Statistics using Imputed Non-Detects**											
1726	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1727	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1728	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1729	This is especially true when the sample size is small.											
1730	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1731	Minimum					0.01	Mean					0.751
1732	Maximum					12	Median					0.295
1733	SD					1.873	CV					2.495
1734	k hat (MLE)					0.508	k star (bias corrected MLE)					0.496
1735	Theta hat (MLE)					1.479	Theta star (bias corrected MLE)					1.514
1736	nu hat (MLE)					74.1	nu star (bias corrected)					72.39
1737	Adjusted Level of Significance (β)					0.0467						
1738	Approximate Chi Square Value (72.39, α)					53.79	Adjusted Chi Square Value (72.39, β)					53.47
1739	95% Gamma Approximate UCL (use when n>=50)					1.01	95% Gamma Adjusted UCL (use when n<50)					1.016
1740												
1741	**Estimates of Gamma Parameters using KM Estimates**											
1742	Mean (KM)					0.776	SD (KM)					1.851
1743	Variance (KM)					3.425	SE of Mean (KM)					0.218
1744	k hat (KM)					0.176	k star (KM)					0.178
1745	nu hat (KM)					25.68	nu star (KM)					25.96
1746	theta hat (KM)					4.413	theta star (KM)					4.365
1747	80% gamma percentile (KM)					0.956	90% gamma percentile (KM)					2.339
1748	95% gamma percentile (KM)					4.118	99% gamma percentile (KM)					9.114
1749												
1750	**Gamma Kaplan-Meier (KM) Statistics**											
1751	Approximate Chi Square Value (25.96, α)					15.35	Adjusted Chi Square Value (25.96, β)					15.18
1752	95% Gamma Approximate KM-UCL (use when n>=50)					1.313	95% Gamma Adjusted KM-UCL (use when n<50)					1.327
1753												
1754	**Lognormal GOF Test on Detected Observations Only**											
1755	Shapiro Wilk Approximate Test Statistic					0.833	**Shapiro Wilk GOF Test**					
1756	5% Shapiro Wilk P Value					6.2028E-9	Detected Data Not Lognormal at 5% Significance Level					
1757	Lilliefors Test Statistic					0.176	**Lilliefors GOF Test**					
1758	5% Lilliefors Critical Value					0.114	Detected Data Not Lognormal at 5% Significance Level					
1759	**Detected Data Not Lognormal at 5% Significance Level**											
1760												
1761	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1762	Mean in Original Scale					0.77	Mean in Log Scale					-1.099
1763	SD in Original Scale					1.866	SD in Log Scale					1.02
1764	95% t UCL (assumes normality of ROS data)					1.134	95% Percentile Bootstrap UCL					1.166
1765	95% BCA Bootstrap UCL					1.26	95% Bootstrap t UCL					1.517
1766	95% H-UCL (Log ROS)					0.737						
1767												
1768	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1769	KM Mean (logged)					-1.052	KM Geo Mean					0.349
1770	KM SD (logged)					0.963	95% Critical H Value (KM-Log)					2.219
1771	KM Standard Error of Mean (logged)					0.114	95% H-UCL (KM -Log)					0.715
1772	KM SD (logged)					0.963	95% Critical H Value (KM-Log)					2.219
1773	KM Standard Error of Mean (logged)					0.114						
1774												
1775	**DL/2 Statistics**											
1776	**DL/2 Normal**						**DL/2 Log-Transformed**					
1777	Mean in Original Scale					0.767	Mean in Log Scale					-1.122
1778	SD in Original Scale					1.867	SD in Log Scale					1.039
1779	95% t UCL (Assumes normality)					1.131	95% H-Stat UCL					0.74
1780	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1781												
1782	**Nonparametric Distribution Free UCL Statistics**											

1783	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1784												
1785	**Suggested UCL to Use**											
1786	95% KM (Chebyshev) UCL					1.728						
1787												
1788	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1789	Recommendations are based upon data size, data distribution, and skewness.											
1790	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1791	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1792												
1793	**Val_BENZOBFLUORANTHENE**											
1794												
1795	**General Statistics**											
1796	Total Number of Observations					73				Number of Distinct Observations		48
1797	Number of Detects					63				Number of Non-Detects		10
1798	Number of Distinct Detects					47				Number of Distinct Non-Detects		6
1799	Minimum Detect					0.11				Minimum Non-Detect		0.18
1800	Maximum Detect					19.1				Maximum Non-Detect		0.25
1801	Variance Detects					6.845				Percent Non-Detects		13.7%
1802	Mean Detects					1.035				SD Detects		2.616
1803	Median Detects					0.41				CV Detects		2.527
1804	Skewness Detects					5.908				Kurtosis Detects		38.52
1805	Mean of Logged Detects					-0.744				SD of Logged Detects		0.988
1806												
1807	**Normal GOF Test on Detects Only**											
1808	Shapiro Wilk Test Statistic					0.341				**Normal GOF Test on Detected Observations Only**		
1809	5% Shapiro Wilk P Value					0				Detected Data Not Normal at 5% Significance Level		
1810	Lilliefors Test Statistic					0.362				**Lilliefors GOF Test**		
1811	5% Lilliefors Critical Value					0.111				Detected Data Not Normal at 5% Significance Level		
1812	**Detected Data Not Normal at 5% Significance Level**											
1813												
1814	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1815	KM Mean					0.914				KM Standard Error of Mean		0.287
1816	KM SD					2.43				95% KM (BCA) UCL		1.434
1817	95% KM (t) UCL					1.392				95% KM (Percentile Bootstrap) UCL		1.45
1818	95% KM (z) UCL					1.386				95% KM Bootstrap t UCL		2.533
1819	90% KM Chebyshev UCL					1.775				95% KM Chebyshev UCL		2.164
1820	97.5% KM Chebyshev UCL					2.705				99% KM Chebyshev UCL		3.767
1821												
1822	**Gamma GOF Tests on Detected Observations Only**											
1823	A-D Test Statistic					5.975				**Anderson-Darling GOF Test**		
1824	5% A-D Critical Value					0.791				Detected Data Not Gamma Distributed at 5% Significance Level		
1825	K-S Test Statistic					0.253				**Kolmogorov-Smirnov GOF**		
1826	5% K-S Critical Value					0.117				Detected Data Not Gamma Distributed at 5% Significance Level		
1827	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1828												
1829	**Gamma Statistics on Detected Data Only**											
1830	k hat (MLE)					0.766				k star (bias corrected MLE)		0.74
1831	Theta hat (MLE)					1.352				Theta star (bias corrected MLE)		1.399
1832	nu hat (MLE)					96.52				nu star (bias corrected)		93.26
1833	Mean (detects)					1.035						
1834												
1835	**Gamma ROS Statistics using Imputed Non-Detects**											
1836	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1837	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1838	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1839	This is especially true when the sample size is small.											
1840	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1841	Minimum					0.01				Mean		0.895
1842	Maximum					19.1				Median		0.38
1843	SD					2.454				CV		2.742
1844	k hat (MLE)					0.54				k star (bias corrected MLE)		0.527
1845	Theta hat (MLE)					1.657				Theta star (bias corrected MLE)		1.698
1846	nu hat (MLE)					78.85				nu star (bias corrected)		76.94
1847	Adjusted Level of Significance (β)					0.0467						
1848	Approximate Chi Square Value (76.94, α)					57.73				Adjusted Chi Square Value (76.94, β)		57.4
1849	95% Gamma Approximate UCL (use when n>=50)					1.193				95% Gamma Adjusted UCL (use when n<50)		1.2
1850												
1851	**Estimates of Gamma Parameters using KM Estimates**											
1852	Mean (KM)					0.914				SD (KM)		2.43
1853	Variance (KM)					5.906				SE of Mean (KM)		0.287
1854	k hat (KM)					0.142				k star (KM)		0.145
1855	nu hat (KM)					20.67				nu star (KM)		21.15
1856	theta hat (KM)					6.459				theta star (KM)		6.311
1857	80% gamma percentile (KM)					0.967				90% gamma percentile (KM)		2.698
1858	95% gamma percentile (KM)					5.066				99% gamma percentile (KM)		11.99
1859												
1860	**Gamma Kaplan-Meier (KM) Statistics**											
1861	Approximate Chi Square Value (21.15, α)					11.71				Adjusted Chi Square Value (21.15, β)		11.56
1862	95% Gamma Approximate KM-UCL (use when n>=50)					1.652				95% Gamma Adjusted KM-UCL (use when n<50)		1.673
1863												

	A	B	C	D	E	F	G	H	I	J	K	L
1864	**Lognormal GOF Test on Detected Observations Only**											
1865					Shapiro Wilk Approximate Test Statistic	0.899	**Shapiro Wilk GOF Test**					
1866					5% Shapiro Wilk P Value	1.9314E-5	Detected Data Not Lognormal at 5% Significance Level					
1867					Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**					
1868					5% Lilliefors Critical Value	0.111	Detected Data Not Lognormal at 5% Significance Level					
1869	**Detected Data Not Lognormal at 5% Significance Level**											
1870												
1871	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1872					Mean in Original Scale	0.91				Mean in Log Scale	-0.939	
1873					SD in Original Scale	2.449				SD in Log Scale	1.045	
1874					95% t UCL (assumes normality of ROS data)	1.387				95% Percentile Bootstrap UCL	1.464	
1875					95% BCA Bootstrap UCL	1.652				95% Bootstrap t UCL	2.415	
1876					95% H-UCL (Log ROS)	0.895						
1877												
1878	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1879					KM Mean (logged)	-0.903				KM Geo Mean	0.405	
1880					KM SD (logged)	0.996				95% Critical H Value (KM-Log)	2.251	
1881					KM Standard Error of Mean (logged)	0.118				95% H-UCL (KM -Log)	0.867	
1882					KM SD (logged)	0.996				95% Critical H Value (KM-Log)	2.251	
1883					KM Standard Error of Mean (logged)	0.118						
1884												
1885	**DL/2 Statistics**											
1886	**DL/2 Normal**						**DL/2 Log-Transformed**					
1887					Mean in Original Scale	0.907				Mean in Log Scale	-0.957	
1888					SD in Original Scale	2.449				SD in Log Scale	1.063	
1889					95% t UCL (Assumes normality)	1.385				95% H-Stat UCL	0.904	
1890	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1891												
1892	**Nonparametric Distribution Free UCL Statistics**											
1893	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1894												
1895	**Suggested UCL to Use**											
1896					95% KM (Chebyshev) UCL	2.164						
1897												
1898	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1899	Recommendations are based upon data size, data distribution, and skewness.											
1900	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1901	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1902												
1903	**Val_BIS2_ETHYLHEXYL_PHTHALATE**											
1904												
1905	**General Statistics**											
1906					Total Number of Observations	73				Number of Distinct Observations	45	
1907					Number of Detects	59				Number of Non-Detects	14	
1908					Number of Distinct Detects	43				Number of Distinct Non-Detects	4	
1909					Minimum Detect	0.066				Minimum Non-Detect	0.19	
1910					Maximum Detect	180				Maximum Non-Detect	0.22	
1911					Variance Detects	555				Percent Non-Detects	19.18%	
1912					Mean Detects	4.075				SD Detects	23.56	
1913					Median Detects	0.3				CV Detects	5.781	
1914					Skewness Detects	7.443				Kurtosis Detects	56.33	
1915					Mean of Logged Detects	-0.894				SD of Logged Detects	1.336	
1916												
1917	**Normal GOF Test on Detects Only**											
1918					Shapiro Wilk Test Statistic	0.175	**Normal GOF Test on Detected Observations Only**					
1919					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
1920					Lilliefors Test Statistic	0.479	**Lilliefors GOF Test**					
1921					5% Lilliefors Critical Value	0.115	Detected Data Not Normal at 5% Significance Level					
1922	**Detected Data Not Normal at 5% Significance Level**											
1923												
1924	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1925					KM Mean	3.319				KM Standard Error of Mean	2.486	
1926					KM SD	21.06				95% KM (BCA) UCL	8.247	
1927					95% KM (t) UCL	7.46				95% KM (Percentile Bootstrap) UCL	8.199	
1928					95% KM (z) UCL	7.407				95% KM Bootstrap t UCL	65.21	
1929					90% KM Chebyshev UCL	10.78				95% KM Chebyshev UCL	14.15	
1930					97.5% KM Chebyshev UCL	18.84				99% KM Chebyshev UCL	28.05	
1931												
1932	**Gamma GOF Tests on Detected Observations Only**											
1933					A-D Test Statistic	12.64	**Anderson-Darling GOF Test**					
1934					5% A-D Critical Value	0.863	Detected Data Not Gamma Distributed at 5% Significance Level					
1935					K-S Test Statistic	0.371	**Kolmogorov-Smirnov GOF**					
1936					5% K-S Critical Value	0.126	Detected Data Not Gamma Distributed at 5% Significance Level					
1937	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1938												
1939	**Gamma Statistics on Detected Data Only**											
1940					k hat (MLE)	0.3				k star (bias corrected MLE)	0.296	
1941					Theta hat (MLE)	13.58				Theta star (bias corrected MLE)	13.76	
1942					nu hat (MLE)	35.4				nu star (bias corrected)	34.93	
1943					Mean (detects)	4.075						
1944												

1945	**Gamma ROS Statistics using Imputed Non-Detects**											
1946	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1947	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1948	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1949	This is especially true when the sample size is small.											
1950	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1951					Minimum	0.01				Mean		3.295
1952					Maximum	180				Median		0.26
1953					SD	21.2				CV		6.435
1954					k hat (MLE)	0.253				k star (bias corrected MLE)		0.252
1955					Theta hat (MLE)	13.01				Theta star (bias corrected MLE)		13.07
1956					nu hat (MLE)	36.98				nu star (bias corrected)		36.8
1957					Adjusted Level of Significance (β)	0.0467						
1958					Approximate Chi Square Value (36.80, α)	23.91				Adjusted Chi Square Value (36.80, β)		23.7
1959					95% Gamma Approximate UCL (use when n>=50)	5.071				95% Gamma Adjusted UCL (use when n<50)		5.116
1960												
1961	**Estimates of Gamma Parameters using KM Estimates**											
1962					Mean (KM)	3.319				SD (KM)		21.06
1963					Variance (KM)	443.3				SE of Mean (KM)		2.486
1964					k hat (KM)	0.0248				k star (KM)		0.033
1965					nu hat (KM)	3.627				nu star (KM)		4.811
1966					theta hat (KM)	133.6				theta star (KM)		100.7
1967					80% gamma percentile (KM)	0.0666				90% gamma percentile (KM)		2.429
1968					95% gamma percentile (KM)	13.94				99% gamma percentile (KM)		83.45
1969												
1970	**Gamma Kaplan-Meier (KM) Statistics**											
1971					Approximate Chi Square Value (4.81, α)	1.066				Adjusted Chi Square Value (4.81, β)		1.032
1972					95% Gamma Approximate KM-UCL (use when n>=50)	14.98				95% Gamma Adjusted KM-UCL (use when n<50)		15.47
1973												
1974	**Lognormal GOF Test on Detected Observations Only**											
1975					Shapiro Wilk Approximate Test Statistic	0.802				**Shapiro Wilk GOF Test**		
1976					5% Shapiro Wilk P Value	2.192E-10				Detected Data Not Lognormal at 5% Significance Level		
1977					Lilliefors Test Statistic	0.167				**Lilliefors GOF Test**		
1978					5% Lilliefors Critical Value	0.115				Detected Data Not Lognormal at 5% Significance Level		
1979	**Detected Data Not Lognormal at 5% Significance Level**											
1980												
1981	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1982					Mean in Original Scale	3.315				Mean in Log Scale		-1.161
1983					SD in Original Scale	21.2				SD in Log Scale		1.335
1984					95% t UCL (assumes normality of ROS data)	7.449				95% Percentile Bootstrap UCL		8.251
1985					95% BCA Bootstrap UCL	10.95				95% Bootstrap t UCL		65.83
1986					95% H-UCL (Log ROS)	1.15						
1987												
1988	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1989					KM Mean (logged)	-1.115				KM Geo Mean		0.328
1990					KM SD (logged)	1.278				95% Critical H Value (KM-Log)		2.542
1991					KM Standard Error of Mean (logged)	0.152				95% H-UCL (KM -Log)		1.089
1992					KM SD (logged)	1.278				95% Critical H Value (KM-Log)		2.542
1993					KM Standard Error of Mean (logged)	0.152						
1994												
1995	**DL/2 Statistics**											
1996	**DL/2 Normal**									**DL/2 Log-Transformed**		
1997					Mean in Original Scale	3.313				Mean in Log Scale		-1.161
1998					SD in Original Scale	21.2				SD in Log Scale		1.321
1999					95% t UCL (Assumes normality)	7.448				95% H-Stat UCL		1.121
2000	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2001												
2002	**Nonparametric Distribution Free UCL Statistics**											
2003	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2004												
2005	**Suggested UCL to Use**											
2006					95% KM (Chebyshev) UCL	14.15						
2007												
2008	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2009	Recommendations are based upon data size, data distribution, and skewness.											
2010	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2011	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2012												
2013	**Val_DIBENZAHANTHRACENE**											
2014												
2015	**General Statistics**											
2016					Total Number of Observations	73				Number of Distinct Observations		21
2017					Number of Detects	23				Number of Non-Detects		50
2018					Number of Distinct Detects	17				Number of Distinct Non-Detects		9
2019					Minimum Detect	0.14				Minimum Non-Detect		0.18
2020					Maximum Detect	3.1				Maximum Non-Detect		0.26
2021					Variance Detects	0.653				Percent Non-Detects		68.49%
2022					Mean Detects	0.545				SD Detects		0.808
2023					Median Detects	0.19				CV Detects		1.482
2024					Skewness Detects	2.354				Kurtosis Detects		4.821
2025					Mean of Logged Detects	-1.223				SD of Logged Detects		0.972

2026												
2027	**Normal GOF Test on Detects Only**											
2028					Shapiro Wilk Test Statistic	0.561	**Shapiro Wilk GOF Test**					
2029					5% Shapiro Wilk Critical Value	0.914	Detected Data Not Normal at 5% Significance Level					
2030					Lilliefors Test Statistic	0.393	**Lilliefors GOF Test**					
2031					5% Lilliefors Critical Value	0.18	Detected Data Not Normal at 5% Significance Level					
2032	**Detected Data Not Normal at 5% Significance Level**											
2033												
2034	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2035					KM Mean	0.278	KM Standard Error of Mean	0.0574				
2036					KM SD	0.479	95% KM (BCA) UCL	0.398				
2037					95% KM (t) UCL	0.374	95% KM (Percentile Bootstrap) UCL	0.378				
2038					95% KM (z) UCL	0.373	95% KM Bootstrap t UCL	0.517				
2039					90% KM Chebyshev UCL	0.451	95% KM Chebyshev UCL	0.529				
2040					97.5% KM Chebyshev UCL	0.637	99% KM Chebyshev UCL	0.85				
2041												
2042	**Gamma GOF Tests on Detected Observations Only**											
2043					A-D Test Statistic	3.27	**Anderson-Darling GOF Test**					
2044					5% A-D Critical Value	0.772	Detected Data Not Gamma Distributed at 5% Significance Level					
2045					K-S Test Statistic	0.294	**Kolmogorov-Smirnov GOF**					
2046					5% K-S Critical Value	0.187	Detected Data Not Gamma Distributed at 5% Significance Level					
2047	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2048												
2049	**Gamma Statistics on Detected Data Only**											
2050					k hat (MLE)	0.943	k star (bias corrected MLE)	0.849				
2051					Theta hat (MLE)	0.578	Theta star (bias corrected MLE)	0.642				
2052					nu hat (MLE)	43.38	nu star (bias corrected)	39.05				
2053					Mean (detects)	0.545						
2054												
2055	**Gamma ROS Statistics using Imputed Non-Detects**											
2056	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2057	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2058	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2059	This is especially true when the sample size is small.											
2060	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2061					Minimum	0.01	Mean	0.233				
2062					Maximum	3.1	Median	0.111				
2063					SD	0.507	CV	2.174				
2064					k hat (MLE)	0.475	k star (bias corrected MLE)	0.465				
2065					Theta hat (MLE)	0.491	Theta star (bias corrected MLE)	0.502				
2066					nu hat (MLE)	69.36	nu star (bias corrected)	67.84				
2067					Adjusted Level of Significance (β)	0.0467						
2068					Approximate Chi Square Value (67.84, α)	49.88	Adjusted Chi Square Value (67.84, β)	49.57				
2069					95% Gamma Approximate UCL (use when n>=50)	0.317	95% Gamma Adjusted UCL (use when n<50)	0.319				
2070												
2071	**Estimates of Gamma Parameters using KM Estimates**											
2072					Mean (KM)	0.278	SD (KM)	0.479				
2073					Variance (KM)	0.23	SE of Mean (KM)	0.0574				
2074					k hat (KM)	0.337	k star (KM)	0.332				
2075					nu hat (KM)	49.2	nu star (KM)	48.51				
2076					theta hat (KM)	0.826	theta star (KM)	0.837				
2077					80% gamma percentile (KM)	0.436	90% gamma percentile (KM)	0.81				
2078					95% gamma percentile (KM)	1.231	99% gamma percentile (KM)	2.313				
2079												
2080	**Gamma Kaplan-Meier (KM) Statistics**											
2081					Approximate Chi Square Value (48.51, α)	33.53	Adjusted Chi Square Value (48.51, β)	33.28				
2082					95% Gamma Approximate KM-UCL (use when n>=50)	0.403	95% Gamma Adjusted KM-UCL (use when n<50)	0.406				
2083												
2084	**Lognormal GOF Test on Detected Observations Only**											
2085					Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**					
2086					5% Shapiro Wilk Critical Value	0.914	Detected Data Not Lognormal at 5% Significance Level					
2087					Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**					
2088					5% Lilliefors Critical Value	0.18	Detected Data Not Lognormal at 5% Significance Level					
2089	**Detected Data Not Lognormal at 5% Significance Level**											
2090												
2091	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2092					Mean in Original Scale	0.29	Mean in Log Scale	-1.653				
2093					SD in Original Scale	0.483	SD in Log Scale	0.72				
2094					95% t UCL (assumes normality of ROS data)	0.385	95% Percentile Bootstrap UCL	0.389				
2095					95% BCA Bootstrap UCL	0.43	95% Bootstrap t UCL	0.471				
2096					95% H-UCL (Log ROS)	0.294						
2097												
2098	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2099					KM Mean (logged)	-1.664	KM Geo Mean	0.189				
2100					KM SD (logged)	0.617	95% Critical H Value (KM-Log)	1.929				
2101					KM Standard Error of Mean (logged)	0.0763	95% H-UCL (KM -Log)	0.264				
2102					KM SD (logged)	0.617	95% Critical H Value (KM-Log)	1.929				
2103					KM Standard Error of Mean (logged)	0.0763						
2104												
2105	**DL/2 Statistics**											
2106	**DL/2 Normal**						**DL/2 Log-Transformed**					

2107				Mean in Original Scale		0.243				Mean in Log Scale		-1.936
2108				SD in Original Scale		0.492				SD in Log Scale		0.728
2109				95% t UCL (Assumes normality)		0.339				95% H-Stat UCL		0.223
2110	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2111												
2112	**Nonparametric Distribution Free UCL Statistics**											
2113	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2114												
2115	**Suggested UCL to Use**											
2116				95% KM (Chebyshev) UCL		0.529						
2117												
2118	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2119	Recommendations are based upon data size, data distribution, and skewness.											
2120	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2121	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2122												
2123	**Val_INDENO123_CDPYRENE**											
2124												
2125	**General Statistics**											
2126				Total Number of Observations		73				Number of Distinct Observations		40
2127				Number of Detects		52				Number of Non-Detects		21
2128				Number of Distinct Detects		39				Number of Distinct Non-Detects		7
2129				Minimum Detect		0.085				Minimum Non-Detect		0.18
2130				Maximum Detect		9.5				Maximum Non-Detect		0.25
2131				Variance Detects		2.149				Percent Non-Detects		28.77%
2132				Mean Detects		0.683				SD Detects		1.466
2133				Median Detects		0.29				CV Detects		2.146
2134				Skewness Detects		4.896				Kurtosis Detects		26.92
2135				Mean of Logged Detects		-1.07				SD of Logged Detects		0.93
2136												
2137	**Normal GOF Test on Detects Only**											
2138				Shapiro Wilk Test Statistic		0.394	**Normal GOF Test on Detected Observations Only**					
2139				5% Shapiro Wilk P Value		0	Detected Data Not Normal at 5% Significance Level					
2140				Lilliefors Test Statistic		0.388	**Lilliefors GOF Test**					
2141				5% Lilliefors Critical Value		0.122	Detected Data Not Normal at 5% Significance Level					
2142	**Detected Data Not Normal at 5% Significance Level**											
2143												
2144	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2145				KM Mean		0.53				KM Standard Error of Mean		0.148
2146				KM SD		1.249				95% KM (BCA) UCL		0.791
2147				95% KM (t) UCL		0.776				95% KM (Percentile Bootstrap) UCL		0.783
2148				95% KM (z) UCL		0.773				95% KM Bootstrap t UCL		1.159
2149				90% KM Chebyshev UCL		0.973				95% KM Chebyshev UCL		1.174
2150				97.5% KM Chebyshev UCL		1.452				99% KM Chebyshev UCL		1.999
2151												
2152	**Gamma GOF Tests on Detected Observations Only**											
2153				A-D Test Statistic		6.061	**Anderson-Darling GOF Test**					
2154				5% A-D Critical Value		0.788	Detected Data Not Gamma Distributed at 5% Significance Level					
2155				K-S Test Statistic		0.288	**Kolmogorov-Smirnov GOF**					
2156				5% K-S Critical Value		0.128	Detected Data Not Gamma Distributed at 5% Significance Level					
2157	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2158												
2159	**Gamma Statistics on Detected Data Only**											
2160				k hat (MLE)		0.855				k star (bias corrected MLE)		0.818
2161				Theta hat (MLE)		0.799				Theta star (bias corrected MLE)		0.835
2162				nu hat (MLE)		88.88				nu star (bias corrected)		85.08
2163				Mean (detects)		0.683						
2164												
2165	**Gamma ROS Statistics using Imputed Non-Detects**											
2166	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2167	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2168	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2169	This is especially true when the sample size is small.											
2170	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2171				Minimum		0.01				Mean		0.49
2172				Maximum		9.5				Median		0.2
2173				SD		1.271				CV		2.597
2174				k hat (MLE)		0.468				k star (bias corrected MLE)		0.458
2175				Theta hat (MLE)		1.047				Theta star (bias corrected MLE)		1.07
2176				nu hat (MLE)		68.28				nu star (bias corrected)		66.81
2177				Adjusted Level of Significance (β)		0.0467						
2178				Approximate Chi Square Value (66.81, α)		49				Adjusted Chi Square Value (66.81, β)		48.69
2179				95% Gamma Approximate UCL (use when n>=50)		0.667				95% Gamma Adjusted UCL (use when n<50)		0.672
2180												
2181	**Estimates of Gamma Parameters using KM Estimates**											
2182				Mean (KM)		0.53				SD (KM)		1.249
2183				Variance (KM)		1.56				SE of Mean (KM)		0.148
2184				k hat (KM)		0.18				k star (KM)		0.182
2185				nu hat (KM)		26.31				nu star (KM)		26.56
2186				theta hat (KM)		2.942				theta star (KM)		2.914
2187				80% gamma percentile (KM)		0.662				90% gamma percentile (KM)		1.6

2188					95% gamma percentile (KM)	2.797					99% gamma percentile (KM)	6.148
2189												
2190					**Gamma Kaplan-Meier (KM) Statistics**							
2191					Approximate Chi Square Value (26.56, α)	15.81					Adjusted Chi Square Value (26.56, β)	15.65
2192					95% Gamma Approximate KM-UCL (use when n>=50)	0.89					95% Gamma Adjusted KM-UCL (use when n<50)	0.9
2193												
2194					**Lognormal GOF Test on Detected Observations Only**							
2195					Shapiro Wilk Approximate Test Statistic	0.85					**Shapiro Wilk GOF Test**	
2196					5% Shapiro Wilk P Value	7.8164E-7					Detected Data Not Lognormal at 5% Significance Level	
2197					Lilliefors Test Statistic	0.185					**Lilliefors GOF Test**	
2198					5% Lilliefors Critical Value	0.122					Detected Data Not Lognormal at 5% Significance Level	
2199					**Detected Data Not Lognormal at 5% Significance Level**							
2200												
2201					**Lognormal ROS Statistics Using Imputed Non-Detects**							
2202					Mean in Original Scale	0.525					Mean in Log Scale	-1.36
2203					SD in Original Scale	1.259					SD in Log Scale	0.928
2204					95% t UCL (assumes normality of ROS data)	0.77					95% Percentile Bootstrap UCL	0.804
2205					95% BCA Bootstrap UCL	0.938					95% Bootstrap t UCL	1.133
2206					95% H-UCL (Log ROS)	0.501						
2207												
2208					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
2209					KM Mean (logged)	-1.311					KM Geo Mean	0.269
2210					KM SD (logged)	0.873					95% Critical H Value (KM-Log)	2.136
2211					KM Standard Error of Mean (logged)	0.105					95% H-UCL (KM -Log)	0.491
2212					KM SD (logged)	0.873					95% Critical H Value (KM-Log)	2.136
2213					KM Standard Error of Mean (logged)	0.105						
2214												
2215					**DL/2 Statistics**							
2216					**DL/2 Normal**						**DL/2 Log-Transformed**	
2217					Mean in Original Scale	0.516					Mean in Log Scale	-1.416
2218					SD in Original Scale	1.262					SD in Log Scale	0.956
2219					95% t UCL (Assumes normality)	0.762					95% H-Stat UCL	0.492
2220					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
2221												
2222					**Nonparametric Distribution Free UCL Statistics**							
2223					**Data do not follow a Discernible Distribution at 5% Significance Level**							
2224												
2225					**Suggested UCL to Use**							
2226					95% KM (Chebyshev) UCL	1.174						
2227												
2228					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
2229					Recommendations are based upon data size, data distribution, and skewness.							
2230					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
2231					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
2232												
2233	**Val_AROCLOR_1248**											
2234												
2235					**General Statistics**							
2236					Total Number of Observations	77					Number of Distinct Observations	59
2237					Number of Detects	55					Number of Non-Detects	22
2238					Number of Distinct Detects	46					Number of Distinct Non-Detects	13
2239					Minimum Detect	0.062					Minimum Non-Detect	0.036
2240					Maximum Detect	24					Maximum Non-Detect	0.055
2241					Variance Detects	20.12					Percent Non-Detects	28.57%
2242					Mean Detects	4.652					SD Detects	4.485
2243					Median Detects	4.2					CV Detects	0.964
2244					Skewness Detects	2.441					Kurtosis Detects	8.063
2245					Mean of Logged Detects	1.049					SD of Logged Detects	1.177
2246												
2247					**Normal GOF Test on Detects Only**							
2248					Shapiro Wilk Test Statistic	0.774					**Normal GOF Test on Detected Observations Only**	
2249					5% Shapiro Wilk P Value	6.955E-11					Detected Data Not Normal at 5% Significance Level	
2250					Lilliefors Test Statistic	0.171					**Lilliefors GOF Test**	
2251					5% Lilliefors Critical Value	0.119					Detected Data Not Normal at 5% Significance Level	
2252					**Detected Data Not Normal at 5% Significance Level**							
2253												
2254					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
2255					KM Mean	3.333					KM Standard Error of Mean	0.494
2256					KM SD	4.296					95% KM (BCA) UCL	4.227
2257					95% KM (t) UCL	4.156					95% KM (Percentile Bootstrap) UCL	4.173
2258					95% KM (z) UCL	4.146					95% KM Bootstrap t UCL	4.444
2259					90% KM Chebyshev UCL	4.815					95% KM Chebyshev UCL	5.487
2260					97.5% KM Chebyshev UCL	6.419					99% KM Chebyshev UCL	8.249
2261												
2262					**Gamma GOF Tests on Detected Observations Only**							
2263					A-D Test Statistic	0.519					**Anderson-Darling GOF Test**	
2264					5% A-D Critical Value	0.776					Detected data appear Gamma Distributed at 5% Significance Level	
2265					K-S Test Statistic	0.0915					**Kolmogorov-Smirnov GOF**	
2266					5% K-S Critical Value	0.123					Detected data appear Gamma Distributed at 5% Significance Level	
2267					**Detected data appear Gamma Distributed at 5% Significance Level**							
2268												

	A	B	C	D	E	F	G	H	I	J	K	L
2269	**Gamma Statistics on Detected Data Only**											
2270					k hat (MLE)	1.161				k star (bias corrected MLE)		1.11
2271					Theta hat (MLE)	4.005				Theta star (bias corrected MLE)		4.19
2272					nu hat (MLE)	127.8				nu star (bias corrected)		122.1
2273					Mean (detects)	4.652						
2274												
2275	**Gamma ROS Statistics using Imputed Non-Detects**											
2276	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2277	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2278	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2279	This is especially true when the sample size is small.											
2280	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2281					Minimum	0.01				Mean		3.326
2282					Maximum	24				Median		2.4
2283					SD	4.33				CV		1.302
2284					k hat (MLE)	0.376				k star (bias corrected MLE)		0.37
2285					Theta hat (MLE)	8.848				Theta star (bias corrected MLE)		8.991
2286					nu hat (MLE)	57.88				nu star (bias corrected)		56.96
2287					Adjusted Level of Significance (β)	0.0469						
2288					Approximate Chi Square Value (56.96, α)	40.61				Adjusted Chi Square Value (56.96, β)		40.35
2289					95% Gamma Approximate UCL (use when n>=50)	4.664				95% Gamma Adjusted UCL (use when n<50)		4.695
2290												
2291	**Estimates of Gamma Parameters using KM Estimates**											
2292					Mean (KM)	3.333				SD (KM)		4.296
2293					Variance (KM)	18.46				SE of Mean (KM)		0.494
2294					k hat (KM)	0.602				k star (KM)		0.587
2295					nu hat (KM)	92.7				nu star (KM)		90.42
2296					theta hat (KM)	5.537				theta star (KM)		5.677
2297					80% gamma percentile (KM)	5.494				90% gamma percentile (KM)		8.711
2298					95% gamma percentile (KM)	12.09				99% gamma percentile (KM)		20.27
2299												
2300	**Gamma Kaplan-Meier (KM) Statistics**											
2301					Approximate Chi Square Value (90.42, α)	69.49				Adjusted Chi Square Value (90.42, β)		69.15
2302					95% Gamma Approximate KM-UCL (use when n>=50)	4.337				95% Gamma Adjusted KM-UCL (use when n<50)		4.359
2303												
2304	**Lognormal GOF Test on Detected Observations Only**											
2305					Shapiro Wilk Approximate Test Statistic	0.923				**Shapiro Wilk GOF Test**		
2306					5% Shapiro Wilk P Value	0.00169				Detected Data Not Lognormal at 5% Significance Level		
2307					Lilliefors Test Statistic	0.151				**Lilliefors GOF Test**		
2308					5% Lilliefors Critical Value	0.119				Detected Data Not Lognormal at 5% Significance Level		
2309	**Detected Data Not Lognormal at 5% Significance Level**											
2310												
2311	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2312					Mean in Original Scale	3.401				Mean in Log Scale		0.362
2313					SD in Original Scale	4.273				SD in Log Scale		1.488
2314					95% t UCL (assumes normality of ROS data)	4.212				95% Percentile Bootstrap UCL		4.228
2315					95% BCA Bootstrap UCL	4.365				95% Bootstrap t UCL		4.462
2316					95% H-UCL (Log ROS)	6.994						
2317												
2318	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2319					KM Mean (logged)	-0.201				KM Geo Mean		0.818
2320					KM SD (logged)	2.208				95% Critical H Value (KM-Log)		3.701
2321					KM Standard Error of Mean (logged)	0.254				95% H-UCL (KM -Log)		23.89
2322					KM SD (logged)	2.208				95% Critical H Value (KM-Log)		3.701
2323					KM Standard Error of Mean (logged)	0.254						
2324												
2325	**DL/2 Statistics**											
2326	**DL/2 Normal**								**DL/2 Log-Transformed**			
2327					Mean in Original Scale	3.329				Mean in Log Scale		-0.359
2328					SD in Original Scale	4.328				SD in Log Scale		2.451
2329					95% t UCL (Assumes normality)	4.15				95% H-Stat UCL		43.7
2330	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2331												
2332	**Nonparametric Distribution Free UCL Statistics**											
2333	**Detected Data appear Gamma Distributed at 5% Significance Level**											
2334												
2335	**Suggested UCL to Use**											
2336					95% KM Approximate Gamma UCL	4.337				95% GROS Approximate Gamma UCL		4.664
2337												
2338	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2339	Recommendations are based upon data size, data distribution, and skewness.											
2340	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2341	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2342												
2343	**Val_AROCLOR_1260**											
2344												
2345	**General Statistics**											
2346					Total Number of Observations	77				Number of Distinct Observations		60
2347					Number of Detects	69				Number of Non-Detects		8
2348					Number of Distinct Detects	56				Number of Distinct Non-Detects		6
2349					Minimum Detect	0.033				Minimum Non-Detect		0.039

	A	B	C	D	E	F	G	H	I	J	K	L
2350					Maximum Detect	32				Maximum Non-Detect		0.046
2351					Variance Detects	30.69				Percent Non-Detects		10.39%
2352					Mean Detects	5.487				SD Detects		5.54
2353					Median Detects	4.6				CV Detects		1.01
2354					Skewness Detects	1.952				Kurtosis Detects		6.54
2355					Mean of Logged Detects	0.88				SD of Logged Detects		1.705
2356												
2357					**Normal GOF Test on Detects Only**							
2358					Shapiro Wilk Test Statistic	0.839	**Normal GOF Test on Detected Observations Only**					
2359					5% Shapiro Wilk P Value	4.301E-10	Detected Data Not Normal at 5% Significance Level					
2360					Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**					
2361					5% Lilliefors Critical Value	0.107	Detected Data Not Normal at 5% Significance Level					
2362					**Detected Data Not Normal at 5% Significance Level**							
2363												
2364					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
2365					KM Mean	4.92	KM Standard Error of Mean					0.627
2366					KM SD	5.465	95% KM (BCA) UCL					5.947
2367					95% KM (t) UCL	5.965	95% KM (Percentile Bootstrap) UCL					5.91
2368					95% KM (z) UCL	5.952	95% KM Bootstrap t UCL					6.203
2369					90% KM Chebyshev UCL	6.802	95% KM Chebyshev UCL					7.655
2370					97.5% KM Chebyshev UCL	8.838	99% KM Chebyshev UCL					11.16
2371												
2372					**Gamma GOF Tests on Detected Observations Only**							
2373					A-D Test Statistic	0.945	**Anderson-Darling GOF Test**					
2374					5% A-D Critical Value	0.794	Detected Data Not Gamma Distributed at 5% Significance Level					
2375					K-S Test Statistic	0.107	**Kolmogorov-Smirnov GOF**					
2376					5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level					
2377					**Detected data follow Appr. Gamma Distribution at 5% Significance Level**							
2378												
2379					**Gamma Statistics on Detected Data Only**							
2380					k hat (MLE)	0.731	k star (bias corrected MLE)					0.709
2381					Theta hat (MLE)	7.509	Theta star (bias corrected MLE)					7.743
2382					nu hat (MLE)	100.8	nu star (bias corrected)					97.78
2383					Mean (detects)	5.487						
2384												
2385					**Gamma ROS Statistics using Imputed Non-Detects**							
2386					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
2387					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
2388					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
2389					This is especially true when the sample size is small.							
2390					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
2391					Minimum	0.033	Mean					4.933
2392					Maximum	32	Median					3.25
2393					SD	5.49	CV					1.113
2394					k hat (MLE)	0.612	k star (bias corrected MLE)					0.597
2395					Theta hat (MLE)	8.055	Theta star (bias corrected MLE)					8.26
2396					nu hat (MLE)	94.32	nu star (bias corrected)					91.97
2397					Adjusted Level of Significance (β)	0.0469						
2398					Approximate Chi Square Value (91.97, α)	70.86	Adjusted Chi Square Value (91.97, β)					70.51
2399					95% Gamma Approximate UCL (use when n>=50)	6.403	95% Gamma Adjusted UCL (use when n<50)					6.435
2400												
2401					**Estimates of Gamma Parameters using KM Estimates**							
2402					Mean (KM)	4.92	SD (KM)					5.465
2403					Variance (KM)	29.87	SE of Mean (KM)					0.627
2404					k hat (KM)	0.81	k star (KM)					0.788
2405					nu hat (KM)	124.8	nu star (KM)					121.3
2406					theta hat (KM)	6.071	theta star (KM)					6.247
2407					80% gamma percentile (KM)	8.047	90% gamma percentile (KM)					12.01
2408					95% gamma percentile (KM)	16.05	99% gamma percentile (KM)					25.61
2409												
2410					**Gamma Kaplan-Meier (KM) Statistics**							
2411					Approximate Chi Square Value (121.28, α)	96.85	Adjusted Chi Square Value (121.28, β)					96.44
2412					95% Gamma Approximate KM-UCL (use when n>=50)	6.161	95% Gamma Adjusted KM-UCL (use when n<50)					6.188
2413												
2414					**Lognormal GOF Test on Detected Observations Only**							
2415					Shapiro Wilk Approximate Test Statistic	0.869	**Shapiro Wilk GOF Test**					
2416					5% Shapiro Wilk P Value	5.0512E-8	Detected Data Not Lognormal at 5% Significance Level					
2417					Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**					
2418					5% Lilliefors Critical Value	0.107	Detected Data Not Lognormal at 5% Significance Level					
2419					**Detected Data Not Lognormal at 5% Significance Level**							
2420												
2421					**Lognormal ROS Statistics Using Imputed Non-Detects**							
2422					Mean in Original Scale	4.926	Mean in Log Scale					0.537
2423					SD in Original Scale	5.496	SD in Log Scale					1.908
2424					95% t UCL (assumes normality of ROS data)	5.969	95% Percentile Bootstrap UCL					6.041
2425					95% BCA Bootstrap UCL	6.144	95% Bootstrap t UCL					6.136
2426					95% H-UCL (Log ROS)	21.77						
2427												
2428					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
2429					KM Mean (logged)	0.437	KM Geo Mean					1.547
2430					KM SD (logged)	2.065	95% Critical H Value (KM-Log)					3.513

	A	B	C	D	E	F	G	H	I	J	K	L
2431				KM Standard Error of Mean (logged)		0.237				95% H-UCL (KM -Log)		29.98
2432				KM SD (logged)		2.065				95% Critical H Value (KM-Log)		3.513
2433				KM Standard Error of Mean (logged)		0.237						
2434												
2435						**DL/2 Statistics**						
2436						**DL/2 Normal**				**DL/2 Log-Transformed**		
2437						Mean in Original Scale	4.919			Mean in Log Scale		0.387
2438						SD in Original Scale	5.502			SD in Log Scale		2.175
2439						95% t UCL (Assumes normality)	5.963			95% H-Stat UCL		39
2440						**DL/2 is not a recommended method, provided for comparisons and historical reasons**						
2441												
2442						**Nonparametric Distribution Free UCL Statistics**						
2443						**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**						
2444												
2445						**Suggested UCL to Use**						
2446						95% KM Approximate Gamma UCL	6.161					
2447												
2448						When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test						
2449						When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL						
2450												
2451						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
2452						Recommendations are based upon data size, data distribution, and skewness.						
2453						These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).						
2454						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
2455												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/15/2017 2:44:21 PM								
5			From File	Soil539-Peck_Soils=0-12_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_ALUMINUM_FUME_OR_DUST**											
12												
13	**General Statistics**											
14						Total Number of Observations	320			Number of Distinct Observations	254		
15										Number of Missing Observations	0	
16						Minimum	633			Mean	15551	
17						Maximum	1240000			Median	10000	
18						SD	69034			Std. Error of Mean	3859	
19						Coefficient of Variation	4.439			Skewness	17.6	
20												
21	**Normal GOF Test**											
22						Shapiro Wilk Test Statistic	0.106			**Shapiro Wilk GOF Test**		
23						5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level		
24						Lilliefors Test Statistic	0.416			**Lilliefors GOF Test**		
25						5% Lilliefors Critical Value	0.0499			Data Not Normal at 5% Significance Level		
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29						**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**		
30						95% Student's-t UCL	21917			95% Adjusted-CLT UCL (Chen-1995)	25956	
31										95% Modified-t UCL (Johnson-1978)	22550	
32												
33	**Gamma GOF Test**											
34						A-D Test Statistic	3.125E+28			**Anderson-Darling Gamma GOF Test**		
35						5% A-D Critical Value	0.777			Data Not Gamma Distributed at 5% Significance Level		
36						K-S Test Statistic	0.193			**Kolmogorov-Smirnov Gamma GOF Test**		
37						5% K-S Critical Value	0.0519			Data Not Gamma Distributed at 5% Significance Level		
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41						k hat (MLE)	1.314			k star (bias corrected MLE)	1.304	
42						Theta hat (MLE)	11831			Theta star (bias corrected MLE)	11924	
43						nu hat (MLE)	841.2			nu star (bias corrected)	834.7	
44						MLE Mean (bias corrected)	15551			MLE Sd (bias corrected)	13617	
45										Approximate Chi Square Value (0.05)	768.6	
46						Adjusted Level of Significance	0.0493			Adjusted Chi Square Value	768.3	
47												
48	**Assuming Gamma Distribution**											
49						95% Approximate Gamma UCL (use when n>=50))	16887			95% Adjusted Gamma UCL (use when n<50)	16893	
50												
51	**Lognormal GOF Test**											
52						Shapiro Wilk Test Statistic	0.945			**Shapiro Wilk Lognormal GOF Test**		

53	5% Shapiro Wilk P Value					2.076E-14	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.0649	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.0499	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					6.45	Mean of logged Data					9.226
60	Maximum of Logged Data					14.03	SD of logged Data					0.633
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					13247	90% Chebyshev (MVUE) UCL					13828
64	95% Chebyshev (MVUE) UCL					14479	97.5% Chebyshev (MVUE) UCL					15382
65	99% Chebyshev (MVUE) UCL					17155						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					21899	95% Jackknife UCL					21917
72	95% Standard Bootstrap UCL					22010	95% Bootstrap-t UCL					60444
73	95% Hall's Bootstrap UCL					49477	95% Percentile Bootstrap UCL					23177
74	95% BCA Bootstrap UCL					27805						
75	90% Chebyshev(Mean, Sd) UCL					27128	95% Chebyshev(Mean, Sd) UCL					32372
76	97.5% Chebyshev(Mean, Sd) UCL					39651	99% Chebyshev(Mean, Sd) UCL					53948
77												
78	**Suggested UCL to Use**											
79	95% Chebyshev (Mean, Sd) UCL					32372						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86	**Val_ANTIMONY**											
87												
88	**General Statistics**											
89	Total Number of Observations					320	Number of Distinct Observations					188
90	Number of Detects					187	Number of Non-Detects					133
91	Number of Distinct Detects					162	Number of Distinct Non-Detects					41
92	Minimum Detect					0.23	Minimum Non-Detect					4.8
93	Maximum Detect					1850	Maximum Non-Detect					716
94	Variance Detects					20398	Percent Non-Detects					41.56%
95	Mean Detects					43.29	SD Detects					142.8
96	Median Detects					12.8	CV Detects					3.299
97	Skewness Detects					11.11	Kurtosis Detects					139.3
98	Mean of Logged Detects					2.467	SD of Logged Detects					1.654
99												
100	**Normal GOF Test on Detects Only**											
101	Shapiro Wilk Test Statistic					0.275	**Normal GOF Test on Detected Observations Only**					
102	5% Shapiro Wilk P Value					0	Detected Data Not Normal at 5% Significance Level					
103	Lilliefors Test Statistic					0.382	**Lilliefors GOF Test**					
104	5% Lilliefors Critical Value					0.0652	Detected Data Not Normal at 5% Significance Level					

105	**Detected Data Not Normal at 5% Significance Level**											
106												
107	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
108					KM Mean	26.39			KM Standard Error of Mean			6.21
109					KM SD	110.8			95% KM (BCA) UCL			39.01
110					95% KM (t) UCL	36.64			95% KM (Percentile Bootstrap) UCL			37.92
111					95% KM (z) UCL	36.61			95% KM Bootstrap t UCL			50.39
112					90% KM Chebyshev UCL	45.02			95% KM Chebyshev UCL			53.46
113					97.5% KM Chebyshev UCL	65.18			99% KM Chebyshev UCL			88.18
114												
115	**Gamma GOF Tests on Detected Observations Only**											
116					A-D Test Statistic	4.303			**Anderson-Darling GOF Test**			
117					5% A-D Critical Value	0.823			Detected Data Not Gamma Distributed at 5% Significance Level			
118					K-S Test Statistic	0.116			**Kolmogorov-Smirnov GOF**			
119					5% K-S Critical Value	0.071			Detected Data Not Gamma Distributed at 5% Significance Level			
120	**Detected Data Not Gamma Distributed at 5% Significance Level**											
121												
122	**Gamma Statistics on Detected Data Only**											
123					k hat (MLE)	0.49			k star (bias corrected MLE)			0.486
124					Theta hat (MLE)	88.36			Theta star (bias corrected MLE)			89.14
125					nu hat (MLE)	183.2			nu star (bias corrected)			181.6
126					Mean (detects)	43.29						
127												
128	**Gamma ROS Statistics using Imputed Non-Detects**											
129	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
130	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
131	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
132	This is especially true when the sample size is small.											
133	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
134					Minimum	0.01			Mean			25.3
135					Maximum	1850			Median			1.85
136					SD	111.1			CV			4.392
137					k hat (MLE)	0.199			k star (bias corrected MLE)			0.199
138					Theta hat (MLE)	127.2			Theta star (bias corrected MLE)			127.1
139					nu hat (MLE)	127.3			nu star (bias corrected)			127.4
140					Adjusted Level of Significance (β)	0.0493						
141					Approximate Chi Square Value (127.44, α)	102.4			Adjusted Chi Square Value (127.44, β)			102.3
142					95% Gamma Approximate UCL (use when n>=50)	31.5			95% Gamma Adjusted UCL (use when n<50)			31.53
143												
144	**Estimates of Gamma Parameters using KM Estimates**											
145					Mean (KM)	26.39			SD (KM)			110.8
146					Variance (KM)	12266			SE of Mean (KM)			6.21
147					k hat (KM)	0.0568			k star (KM)			0.0583
148					nu hat (KM)	36.35			nu star (KM)			37.34
149					theta hat (KM)	464.7			theta star (KM)			452.4
150					80% gamma percentile (KM)	5.881			90% gamma percentile (KM)			48.26
151					95% gamma percentile (KM)	147			99% gamma percentile (KM)			538.9
152												
153	**Gamma Kaplan-Meier (KM) Statistics**											
154					Approximate Chi Square Value (37.34, α)	24.35			Adjusted Chi Square Value (37.34, β)			24.3
155					95% Gamma Approximate KM-UCL (use when n>=50)	40.47			95% Gamma Adjusted KM-UCL (use when n<50)			40.55
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	**Lognormal GOF Test on Detected Observations Only**											
158					Shapiro Wilk Approximate Test Statistic	0.981	**Shapiro Wilk GOF Test**					
159					5% Shapiro Wilk P Value	0.393	Detected Data appear Lognormal at 5% Significance Level					
160					Lilliefors Test Statistic	0.0481	**Lilliefors GOF Test**					
161					5% Lilliefors Critical Value	0.0652	Detected Data appear Lognormal at 5% Significance Level					
162	**Detected Data appear Lognormal at 5% Significance Level**											
163												
164	**Lognormal ROS Statistics Using Imputed Non-Detects**											
165					Mean in Original Scale	26.43				Mean in Log Scale	1.755	
166					SD in Original Scale	110.9				SD in Log Scale	1.597	
167					95% t UCL (assumes normality of ROS data)	36.66				95% Percentile Bootstrap UCL	37.71	
168					95% BCA Bootstrap UCL	44.64				95% Bootstrap t UCL	50.38	
169					95% H-UCL (Log ROS)	26.28						
170												
171	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
172					KM Mean (logged)	1.705				KM Geo Mean	5.503	
173					KM SD (logged)	1.642				95% Critical H Value (KM-Log)	2.713	
174					KM Standard Error of Mean (logged)	0.104				95% H-UCL (KM -Log)	27.19	
175					KM SD (logged)	1.642				95% Critical H Value (KM-Log)	2.713	
176					KM Standard Error of Mean (logged)	0.104						
177												
178	**DL/2 Statistics**											
179	**DL/2 Normal**						**DL/2 Log-Transformed**					
180					Mean in Original Scale	27.81				Mean in Log Scale	1.948	
181					SD in Original Scale	112.4				SD in Log Scale	1.437	
182					95% t UCL (Assumes normality)	38.17				95% H-Stat UCL	24.1	
183	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
184												
185	**Nonparametric Distribution Free UCL Statistics**											
186	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
187												
188	**Suggested UCL to Use**											
189					KM H-UCL	27.19						
190												
191	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
192	Recommendations are based upon data size, data distribution, and skewness.											
193	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
194	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
195												
196	**Val_ARSENIC**											
197												
198	**General Statistics**											
199					Total Number of Observations	320				Number of Distinct Observations	194	
200					Number of Detects	316				Number of Non-Detects	4	
201					Number of Distinct Detects	194				Number of Distinct Non-Detects	2	
202					Minimum Detect	0.53				Minimum Non-Detect	1.1	
203					Maximum Detect	161				Maximum Non-Detect	1.2	
204					Variance Detects	226				Percent Non-Detects	1.25%	
205					Mean Detects	12.15				SD Detects	15.03	
206					Median Detects	7.35				CV Detects	1.238	
207					Skewness Detects	4.641				Kurtosis Detects	35.17	
208					Mean of Logged Detects	2.007				SD of Logged Detects	0.999	

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210	**Normal GOF Test on Detects Only**											
211					Shapiro Wilk Test Statistic	0.648	**Normal GOF Test on Detected Observations Only**					
212					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
213					Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**					
214					5% Lilliefors Critical Value	0.0502	Detected Data Not Normal at 5% Significance Level					
215	**Detected Data Not Normal at 5% Significance Level**											
216												
217	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
218					KM Mean	12	KM Standard Error of Mean	0.838				
219					KM SD	14.97	95% KM (BCA) UCL	13.3				
220					95% KM (t) UCL	13.38	95% KM (Percentile Bootstrap) UCL	13.4				
221					95% KM (z) UCL	13.38	95% KM Bootstrap t UCL	13.72				
222					90% KM Chebyshev UCL	14.52	95% KM Chebyshev UCL	15.66				
223					97.5% KM Chebyshev UCL	17.24	99% KM Chebyshev UCL	20.34				
224												
225	**Gamma GOF Tests on Detected Observations Only**											
226					A-D Test Statistic	3.343	**Anderson-Darling GOF Test**					
227					5% A-D Critical Value	0.78	Detected Data Not Gamma Distributed at 5% Significance Level					
228					K-S Test Statistic	0.0894	**Kolmogorov-Smirnov GOF**					
229					5% K-S Critical Value	0.0523	Detected Data Not Gamma Distributed at 5% Significance Level					
230	**Detected Data Not Gamma Distributed at 5% Significance Level**											
231												
232	**Gamma Statistics on Detected Data Only**											
233					k hat (MLE)	1.158	k star (bias corrected MLE)	1.15				
234					Theta hat (MLE)	10.48	Theta star (bias corrected MLE)	10.57				
235					nu hat (MLE)	732.1	nu star (bias corrected)	726.5				
236					Mean (detects)	12.15						
237												
238	**Gamma ROS Statistics using Imputed Non-Detects**											
239	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
240	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
241	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
242	This is especially true when the sample size is small.											
243	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
244					Minimum	0.01	Mean	11.99				
245					Maximum	161	Median	7.3				
246					SD	15	CV	1.251				
247					k hat (MLE)	1.027	k star (bias corrected MLE)	1.02				
248					Theta hat (MLE)	11.68	Theta star (bias corrected MLE)	11.76				
249					nu hat (MLE)	657.4	nu star (bias corrected)	652.6				
250					Adjusted Level of Significance (β)	0.0493						
251					Approximate Chi Square Value (652.56, α)	594.3	Adjusted Chi Square Value (652.56, β)	594				
252					95% Gamma Approximate UCL (use when n>=50)	13.17	95% Gamma Adjusted UCL (use when n<50)	13.17				
253												
254	**Estimates of Gamma Parameters using KM Estimates**											
255					Mean (KM)	12	SD (KM)	14.97				
256					Variance (KM)	224.1	SE of Mean (KM)	0.838				
257					k hat (KM)	0.643	k star (KM)	0.639				
258					nu hat (KM)	411.4	nu star (KM)	408.9				
259					theta hat (KM)	18.67	theta star (KM)	18.79				
260					80% gamma percentile (KM)	19.77	90% gamma percentile (KM)	30.77				

261	95% gamma percentile (KM)					42.22	99% gamma percentile (KM)					69.76
262												
263	**Gamma Kaplan-Meier (KM) Statistics**											
264	Approximate Chi Square Value (408.88, α)					363	Adjusted Chi Square Value (408.88, β)					362.8
265	95% Gamma Approximate KM-UCL (use when n>=50)					13.52	95% Gamma Adjusted KM-UCL (use when n<50)					13.53
266												
267	**Lognormal GOF Test on Detected Observations Only**											
268	Shapiro Wilk Approximate Test Statistic					0.983	**Shapiro Wilk GOF Test**					
269	5% Shapiro Wilk P Value					0.432	Detected Data appear Lognormal at 5% Significance Level					
270	Lilliefors Test Statistic					0.0365	**Lilliefors GOF Test**					
271	5% Lilliefors Critical Value					0.0502	Detected Data appear Lognormal at 5% Significance Level					
272	**Detected Data appear Lognormal at 5% Significance Level**											
273												
274	**Lognormal ROS Statistics Using Imputed Non-Detects**											
275	Mean in Original Scale					12	Mean in Log Scale					1.978
276	SD in Original Scale					14.99	SD in Log Scale					1.026
277	95% t UCL (assumes normality of ROS data)					13.39	95% Percentile Bootstrap UCL					13.44
278	95% BCA Bootstrap UCL					13.72	95% Bootstrap t UCL					13.74
279	95% H-UCL (Log ROS)					13.83						
280												
281	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
282	KM Mean (logged)					1.977	KM Geo Mean					7.221
283	KM SD (logged)					1.026	95% Critical H Value (KM-Log)					2.141
284	KM Standard Error of Mean (logged)					0.0575	95% H-UCL (KM -Log)					13.83
285	KM SD (logged)					1.026	95% Critical H Value (KM-Log)					2.141
286	KM Standard Error of Mean (logged)					0.0575						
287												
288	**DL/2 Statistics**											
289	**DL/2 Normal**						**DL/2 Log-Transformed**					
290	Mean in Original Scale					12	Mean in Log Scale					1.975
291	SD in Original Scale					14.99	SD in Log Scale					1.033
292	95% t UCL (Assumes normality)					13.38	95% H-Stat UCL					13.91
293	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
297												
298	**Suggested UCL to Use**											
299	KM H-UCL					13.83						
300												
301	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
302	Recommendations are based upon data size, data distribution, and skewness.											
303	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
304	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
305												
306	**Val_BARIUM**											
307												
308	**General Statistics**											
309	Total Number of Observations					320	Number of Distinct Observations					288
310	Number of Detects					316	Number of Non-Detects					4
311	Number of Distinct Detects					285	Number of Distinct Non-Detects					4
312	Minimum Detect					8.6	Minimum Non-Detect					23.2

313					Maximum Detect	2525					Maximum Non-Detect	24.8
314					Variance Detects	115343					Percent Non-Detects	1.25%
315					Mean Detects	258.7					SD Detects	339.6
316					Median Detects	116					CV Detects	1.313
317					Skewness Detects	2.879					Kurtosis Detects	11.18
318					Mean of Logged Detects	4.917					SD of Logged Detects	1.123
319												
320					**Normal GOF Test on Detects Only**							
321					Shapiro Wilk Test Statistic	0.682	**Normal GOF Test on Detected Observations Only**					
322					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
323					Lilliefors Test Statistic	0.233	**Lilliefors GOF Test**					
324					5% Lilliefors Critical Value	0.0502	Detected Data Not Normal at 5% Significance Level					
325					**Detected Data Not Normal at 5% Significance Level**							
326												
327					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
328					KM Mean	255.7	KM Standard Error of Mean	18.93				
329					KM SD	338	95% KM (BCA) UCL	288.9				
330					95% KM (t) UCL	286.9	95% KM (Percentile Bootstrap) UCL	288.3				
331					95% KM (z) UCL	286.9	95% KM Bootstrap t UCL	289.9				
332					90% KM Chebyshev UCL	312.5	95% KM Chebyshev UCL	338.2				
333					97.5% KM Chebyshev UCL	373.9	99% KM Chebyshev UCL	444				
334												
335					**Gamma GOF Tests on Detected Observations Only**							
336					A-D Test Statistic	8.222	**Anderson-Darling GOF Test**					
337					5% A-D Critical Value	0.789	Detected Data Not Gamma Distributed at 5% Significance Level					
338					K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**					
339					5% K-S Critical Value	0.0527	Detected Data Not Gamma Distributed at 5% Significance Level					
340					**Detected Data Not Gamma Distributed at 5% Significance Level**							
341												
342					**Gamma Statistics on Detected Data Only**							
343					k hat (MLE)	0.914	k star (bias corrected MLE)	0.907				
344					Theta hat (MLE)	283.1	Theta star (bias corrected MLE)	285.1				
345					nu hat (MLE)	577.6	nu star (bias corrected)	573.5				
346					Mean (detects)	258.7						
347												
348					**Gamma ROS Statistics using Imputed Non-Detects**							
349					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
350					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
351					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
352					This is especially true when the sample size is small.							
353					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
354					Minimum	0.01	Mean	255.5				
355					Maximum	2525	Median	113.5				
356					SD	338.7	CV	1.326				
357					k hat (MLE)	0.797	k star (bias corrected MLE)	0.792				
358					Theta hat (MLE)	320.5	Theta star (bias corrected MLE)	322.7				
359					nu hat (MLE)	510.2	nu star (bias corrected)	506.7				
360					Adjusted Level of Significance (β)	0.0493						
361					Approximate Chi Square Value (506.74, α)	455.5	Adjusted Chi Square Value (506.74, β)	455.3				
362					95% Gamma Approximate UCL (use when n>=50)	284.2	95% Gamma Adjusted UCL (use when n<50)	284.4				
363												
364					**Estimates of Gamma Parameters using KM Estimates**							

	A	B	C	D	E	F	G	H	I	J	K	L
365					Mean (KM)	255.7					SD (KM)	338
366					Variance (KM)	114255					SE of Mean (KM)	18.93
367					k hat (KM)	0.572					k star (KM)	0.569
368					nu hat (KM)	366.3					nu star (KM)	364.2
369					theta hat (KM)	446.8					theta star (KM)	449.4
370					80% gamma percentile (KM)	421.4					90% gamma percentile (KM)	673
371					95% gamma percentile (KM)	937.9					99% gamma percentile (KM)	1582
372												
373					**Gamma Kaplan-Meier (KM) Statistics**							
374					Approximate Chi Square Value (364.22, α)	321					Adjusted Chi Square Value (364.22, β)	320.8
375					95% Gamma Approximate KM-UCL (use when n>=50)	290.2					95% Gamma Adjusted KM-UCL (use when n<50)	290.3
376												
377					**Lognormal GOF Test on Detected Observations Only**							
378					Shapiro Wilk Approximate Test Statistic	0.958			**Shapiro Wilk GOF Test**			
379					5% Shapiro Wilk P Value	1.0641E-7			Detected Data Not Lognormal at 5% Significance Level			
380					Lilliefors Test Statistic	0.0865			**Lilliefors GOF Test**			
381					5% Lilliefors Critical Value	0.0502			Detected Data Not Lognormal at 5% Significance Level			
382					**Detected Data Not Lognormal at 5% Significance Level**							
383												
384					**Lognormal ROS Statistics Using Imputed Non-Detects**							
385					Mean in Original Scale	255.6					Mean in Log Scale	4.887
386					SD in Original Scale	338.6					SD in Log Scale	1.149
387					95% t UCL (assumes normality of ROS data)	286.9					95% Percentile Bootstrap UCL	287.8
388					95% BCA Bootstrap UCL	291.2					95% Bootstrap t UCL	291.6
389					95% H-UCL (Log ROS)	296.2						
390												
391					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
392					KM Mean (logged)	4.891					KM Geo Mean	133.1
393					KM SD (logged)	1.138					95% Critical H Value (KM-Log)	2.235
394					KM Standard Error of Mean (logged)	0.0638					95% H-UCL (KM -Log)	293.4
395					KM SD (logged)	1.138					95% Critical H Value (KM-Log)	2.235
396					KM Standard Error of Mean (logged)	0.0638						
397												
398					**DL/2 Statistics**							
399					**DL/2 Normal**						**DL/2 Log-Transformed**	
400					Mean in Original Scale	255.7					Mean in Log Scale	4.887
401					SD in Original Scale	338.6					SD in Log Scale	1.148
402					95% t UCL (Assumes normality)	286.9					95% H-Stat UCL	295.9
403					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
404												
405					**Nonparametric Distribution Free UCL Statistics**							
406					**Data do not follow a Discernible Distribution at 5% Significance Level**							
407												
408					**Suggested UCL to Use**							
409					95% KM (Chebyshev) UCL	338.2						
410												
411	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
412	Recommendations are based upon data size, data distribution, and skewness.											
413	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
414	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
415												
416	**Val_BERYLLIUM**											

417												
418	**General Statistics**											
419					Total Number of Observations	320			Number of Distinct Observations			131
420					Number of Detects	239			Number of Non-Detects			81
421					Number of Distinct Detects	124			Number of Distinct Non-Detects			24
422					Minimum Detect	0.026			Minimum Non-Detect			0.39
423					Maximum Detect	24.3			Maximum Non-Detect			59.7
424					Variance Detects	7.445			Percent Non-Detects			25.31%
425					Mean Detects	1.512			SD Detects			2.729
426					Median Detects	0.6			CV Detects			1.805
427					Skewness Detects	4.61			Kurtosis Detects			27.7
428					Mean of Logged Detects	-0.378			SD of Logged Detects			1.193
429												
430	**Normal GOF Test on Detects Only**											
431					Shapiro Wilk Test Statistic	0.521			**Normal GOF Test on Detected Observations Only**			
432					5% Shapiro Wilk P Value	0			Detected Data Not Normal at 5% Significance Level			
433					Lilliefors Test Statistic	0.293			**Lilliefors GOF Test**			
434					5% Lilliefors Critical Value	0.0577			Detected Data Not Normal at 5% Significance Level			
435	**Detected Data Not Normal at 5% Significance Level**											
436												
437	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
438					KM Mean	1.205			KM Standard Error of Mean			0.136
439					KM SD	2.417			95% KM (BCA) UCL			1.448
440					95% KM (t) UCL	1.429			95% KM (Percentile Bootstrap) UCL			1.44
441					95% KM (z) UCL	1.429			95% KM Bootstrap t UCL			1.495
442					90% KM Chebyshev UCL	1.612			95% KM Chebyshev UCL			1.797
443					97.5% KM Chebyshev UCL	2.053			99% KM Chebyshev UCL			2.555
444												
445	**Gamma GOF Tests on Detected Observations Only**											
446					A-D Test Statistic	9.167			**Anderson-Darling GOF Test**			
447					5% A-D Critical Value	0.796			Detected Data Not Gamma Distributed at 5% Significance Level			
448					K-S Test Statistic	0.142			**Kolmogorov-Smirnov GOF**			
449					5% K-S Critical Value	0.0615			Detected Data Not Gamma Distributed at 5% Significance Level			
450	**Detected Data Not Gamma Distributed at 5% Significance Level**											
451												
452	**Gamma Statistics on Detected Data Only**											
453					k hat (MLE)	0.756			k star (bias corrected MLE)			0.749
454					Theta hat (MLE)	2			Theta star (bias corrected MLE)			2.018
455					nu hat (MLE)	361.3			nu star (bias corrected)			358.1
456					Mean (detects)	1.512						
457												
458	**Gamma ROS Statistics using Imputed Non-Detects**											
459	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
460	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
461	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
462	This is especially true when the sample size is small.											
463	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
464					Minimum	0.01			Mean			1.147
465					Maximum	24.3			Median			0.36
466					SD	2.44			CV			2.127
467					k hat (MLE)	0.459			k star (bias corrected MLE)			0.457
468					Theta hat (MLE)	2.499			Theta star (bias corrected MLE)			2.511

	A	B	C	D	E	F	G	H	I	J	K	L
469					nu hat (MLE)	293.8				nu star (bias corrected)		292.4
470					Adjusted Level of Significance (β)	0.0493						
471					Approximate Chi Square Value (292.40, α)	253.8				Adjusted Chi Square Value (292.40, β)		253.6
472					95% Gamma Approximate UCL (use when n>=50)	1.322				95% Gamma Adjusted UCL (use when n<50)		1.323
473												
474	**Estimates of Gamma Parameters using KM Estimates**											
475					Mean (KM)	1.205				SD (KM)		2.417
476					Variance (KM)	5.84				SE of Mean (KM)		0.136
477					k hat (KM)	0.249				k star (KM)		0.249
478					nu hat (KM)	159.2				nu star (KM)		159.1
479					theta hat (KM)	4.845				theta star (KM)		4.849
480					80% gamma percentile (KM)	1.747				90% gamma percentile (KM)		3.62
481					95% gamma percentile (KM)	5.845				99% gamma percentile (KM)		11.77
482												
483	**Gamma Kaplan-Meier (KM) Statistics**											
484					Approximate Chi Square Value (159.08, α)	130.9				Adjusted Chi Square Value (159.08, β)		130.8
485					95% Gamma Approximate KM-UCL (use when n>=50)	1.465				95% Gamma Adjusted KM-UCL (use when n<50)		1.466
486												
487	**Lognormal GOF Test on Detected Observations Only**											
488					Shapiro Wilk Approximate Test Statistic	0.972				**Shapiro Wilk GOF Test**		
489					5% Shapiro Wilk P Value	0.0159				Detected Data Not Lognormal at 5% Significance Level		
490					Lilliefors Test Statistic	0.0652				**Lilliefors GOF Test**		
491					5% Lilliefors Critical Value	0.0577				Detected Data Not Lognormal at 5% Significance Level		
492	**Detected Data Not Lognormal at 5% Significance Level**											
493												
494	**Lognormal ROS Statistics Using Imputed Non-Detects**											
495					Mean in Original Scale	1.208				Mean in Log Scale		-0.609
496					SD in Original Scale	2.415				SD in Log Scale		1.136
497					95% t UCL (assumes normality of ROS data)	1.431				95% Percentile Bootstrap UCL		1.441
498					95% BCA Bootstrap UCL	1.486				95% Bootstrap t UCL		1.484
499					95% H-UCL (Log ROS)	1.196						
500												
501	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
502					KM Mean (logged)	-0.626				KM Geo Mean		0.535
503					KM SD (logged)	1.151				95% Critical H Value (KM-Log)		2.246
504					KM Standard Error of Mean (logged)	0.0677				95% H-UCL (KM -Log)		1.199
505					KM SD (logged)	1.151				95% Critical H Value (KM-Log)		2.246
506					KM Standard Error of Mean (logged)	0.0677						
507												
508	**DL/2 Statistics**											
509	**DL/2 Normal**						**DL/2 Log-Transformed**					
510					Mean in Original Scale	1.297				Mean in Log Scale		-0.577
511					SD in Original Scale	2.898				SD in Log Scale		1.118
512					95% t UCL (Assumes normality)	1.564				95% H-Stat UCL		1.204
513	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
514												
515	**Nonparametric Distribution Free UCL Statistics**											
516	**Data do not follow a Discernible Distribution at 5% Significance Level**											
517												
518	**Suggested UCL to Use**											
519					95% KM (Chebyshev) UCL	1.797						
520												

	A	B	C	D	E	F	G	H	I	J	K	L
521	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
522	Recommendations are based upon data size, data distribution, and skewness.											
523	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
524	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
525												
526	**Val_CADMIUM**											
527												
528	**General Statistics**											
529					Total Number of Observations	320			Number of Distinct Observations			213
530					Number of Detects	292			Number of Non-Detects			28
531					Number of Distinct Detects	207			Number of Distinct Non-Detects			13
532					Minimum Detect	0.049			Minimum Non-Detect			0.42
533					Maximum Detect	212			Maximum Non-Detect			59.7
534					Variance Detects	657.3			Percent Non-Detects			8.75%
535					Mean Detects	14.85			SD Detects			25.64
536					Median Detects	3.95			CV Detects			1.727
537					Skewness Detects	3.488			Kurtosis Detects			16.93
538					Mean of Logged Detects	1.365			SD of Logged Detects			1.836
539												
540	**Normal GOF Test on Detects Only**											
541					Shapiro Wilk Test Statistic	0.615		**Normal GOF Test on Detected Observations Only**				
542					5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level				
543					Lilliefors Test Statistic	0.282		**Lilliefors GOF Test**				
544					5% Lilliefors Critical Value	0.0523		Detected Data Not Normal at 5% Significance Level				
545	**Detected Data Not Normal at 5% Significance Level**											
546												
547	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
548					KM Mean	13.6			KM Standard Error of Mean			1.389
549					KM SD	24.79			95% KM (BCA) UCL			15.99
550					95% KM (t) UCL	15.89			95% KM (Percentile Bootstrap) UCL			15.92
551					95% KM (z) UCL	15.89			95% KM Bootstrap t UCL			16.27
552					90% KM Chebyshev UCL	17.77			95% KM Chebyshev UCL			19.66
553					97.5% KM Chebyshev UCL	22.28			99% KM Chebyshev UCL			27.42
554												
555	**Gamma GOF Tests on Detected Observations Only**											
556					A-D Test Statistic	4.703		**Anderson-Darling GOF Test**				
557					5% A-D Critical Value	0.827		Detected Data Not Gamma Distributed at 5% Significance Level				
558					K-S Test Statistic	0.101		**Kolmogorov-Smirnov GOF**				
559					5% K-S Critical Value	0.0562		Detected Data Not Gamma Distributed at 5% Significance Level				
560	**Detected Data Not Gamma Distributed at 5% Significance Level**											
561												
562	**Gamma Statistics on Detected Data Only**											
563					k hat (MLE)	0.48			k star (bias corrected MLE)			0.477
564					Theta hat (MLE)	30.96			Theta star (bias corrected MLE)			31.13
565					nu hat (MLE)	280.1			nu star (bias corrected)			278.5
566					Mean (detects)	14.85						
567												
568	**Gamma ROS Statistics using Imputed Non-Detects**											
569	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
570	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
571	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
572	This is especially true when the sample size is small.											

	A	B	C	D	E	F	G	H	I	J	K	L
573	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
574					Minimum	0.01					Mean	13.56
575					Maximum	212					Median	3.2
576					SD	24.84					CV	1.832
577					k hat (MLE)	0.38					k star (bias corrected MLE)	0.378
578					Theta hat (MLE)	35.7					Theta star (bias corrected MLE)	35.84
579					nu hat (MLE)	243.1					nu star (bias corrected)	242.1
580					Adjusted Level of Significance (β)	0.0493						
581					Approximate Chi Square Value (242.11, α)	207.1					Adjusted Chi Square Value (242.11, β)	206.9
582					95% Gamma Approximate UCL (use when n>=50)	15.85					95% Gamma Adjusted UCL (use when n<50)	15.86
583												
584	**Estimates of Gamma Parameters using KM Estimates**											
585					Mean (KM)	13.6					SD (KM)	24.79
586					Variance (KM)	614.6					SE of Mean (KM)	1.389
587					k hat (KM)	0.301					k star (KM)	0.3
588					nu hat (KM)	192.7					nu star (KM)	192.2
589					theta hat (KM)	45.18					theta star (KM)	45.3
590					80% gamma percentile (KM)	20.87					90% gamma percentile (KM)	40.11
591					95% gamma percentile (KM)	62.2					99% gamma percentile (KM)	119.6
592												
593	**Gamma Kaplan-Meier (KM) Statistics**											
594					Approximate Chi Square Value (192.19, α)	161.1					Adjusted Chi Square Value (192.19, β)	161
595					95% Gamma Approximate KM-UCL (use when n>=50)	16.23					95% Gamma Adjusted KM-UCL (use when n<50)	16.24
596												
597	**Lognormal GOF Test on Detected Observations Only**											
598					Shapiro Wilk Approximate Test Statistic	0.963					**Shapiro Wilk GOF Test**	
599					5% Shapiro Wilk P Value	1.4719E-5					Detected Data Not Lognormal at 5% Significance Level	
600					Lilliefors Test Statistic	0.0577					**Lilliefors GOF Test**	
601					5% Lilliefors Critical Value	0.0523					Detected Data Not Lognormal at 5% Significance Level	
602	**Detected Data Not Lognormal at 5% Significance Level**											
603												
604	**Lognormal ROS Statistics Using Imputed Non-Detects**											
605					Mean in Original Scale	13.59					Mean in Log Scale	1.147
606					SD in Original Scale	24.82					SD in Log Scale	1.898
607					95% t UCL (assumes normality of ROS data)	15.88					95% Percentile Bootstrap UCL	15.77
608					95% BCA Bootstrap UCL	16.44					95% Bootstrap t UCL	16.27
609					95% H-UCL (Log ROS)	26.21						
610												
611	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
612					KM Mean (logged)	1.133					KM Geo Mean	3.104
613					KM SD (logged)	1.92					95% Critical H Value (KM-Log)	3.007
614					KM Standard Error of Mean (logged)	0.108					95% H-UCL (KM -Log)	27.07
615					KM SD (logged)	1.92					95% Critical H Value (KM-Log)	3.007
616					KM Standard Error of Mean (logged)	0.108						
617												
618	**DL/2 Statistics**											
619	**DL/2 Normal**						**DL/2 Log-Transformed**					
620					Mean in Original Scale	13.67					Mean in Log Scale	1.152
621					SD in Original Scale	24.84					SD in Log Scale	1.901
622					95% t UCL (Assumes normality)	15.96					95% H-Stat UCL	26.5
623	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
624												

	A	B	C	D	E	F	G	H	I	J	K	L
625	**Nonparametric Distribution Free UCL Statistics**											
626	**Data do not follow a Discernible Distribution at 5% Significance Level**											
627												
628	**Suggested UCL to Use**											
629	95% KM (Chebyshev) UCL					19.66						
630												
631	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
632	Recommendations are based upon data size, data distribution, and skewness.											
633	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
634	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
635												
636												
637	**Val_CHROMIUM**											
638												
639	**General Statistics**											
640	Total Number of Observations					320			Number of Distinct Observations			278
641									Number of Missing Observations			0
642	Minimum					3.6			Mean			624.1
643	Maximum					113000			Median			50.4
644	SD					6378			Std. Error of Mean			356.6
645	Coefficient of Variation					10.22			Skewness			17.27
646												
647	**Normal GOF Test**											
648	Shapiro Wilk Test Statistic					0.0916			**Shapiro Wilk GOF Test**			
649	5% Shapiro Wilk P Value					0			Data Not Normal at 5% Significance Level			
650	Lilliefors Test Statistic					0.461			**Lilliefors GOF Test**			
651	5% Lilliefors Critical Value					0.0499			Data Not Normal at 5% Significance Level			
652	**Data Not Normal at 5% Significance Level**											
653												
654	**Assuming Normal Distribution**											
655	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
656	95% Student's-t UCL					1212			95% Adjusted-CLT UCL (Chen-1995)			1579
657									95% Modified-t UCL (Johnson-1978)			1270
658												
659	**Gamma GOF Test**											
660	A-D Test Statistic					3.125E+28			**Anderson-Darling Gamma GOF Test**			
661	5% A-D Critical Value					0.869			Data Not Gamma Distributed at 5% Significance Level			
662	K-S Test Statistic					0.248			**Kolmogorov-Smirnov Gamma GOF Test**			
663	5% K-S Critical Value					0.055			Data Not Gamma Distributed at 5% Significance Level			
664	**Data Not Gamma Distributed at 5% Significance Level**											
665												
666	**Gamma Statistics**											
667	k hat (MLE)					0.308			k star (bias corrected MLE)			0.307
668	Theta hat (MLE)					2028			Theta star (bias corrected MLE)			2033
669	nu hat (MLE)					197			nu star (bias corrected)			196.5
670	MLE Mean (bias corrected)					624.1			MLE Sd (bias corrected)			1126
671									Approximate Chi Square Value (0.05)			165
672	Adjusted Level of Significance					0.0493			Adjusted Chi Square Value			164.9
673												
674	**Assuming Gamma Distribution**											
675	95% Approximate Gamma UCL (use when n>=50))					743			95% Adjusted Gamma UCL (use when n<50)			743.6
676												

	A	B	C	D	E	F	G	H	I	J	K	L
677	**Lognormal GOF Test**											
678					Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk Lognormal GOF Test**					
679					5% Shapiro Wilk P Value	1.332E-15	Data Not Lognormal at 5% Significance Level					
680					Lilliefors Test Statistic	0.087	**Lilliefors Lognormal GOF Test**					
681					5% Lilliefors Critical Value	0.0499	Data Not Lognormal at 5% Significance Level					
682	**Data Not Lognormal at 5% Significance Level**											
683												
684	**Lognormal Statistics**											
685					Minimum of Logged Data	1.281			Mean of logged Data	4.205		
686					Maximum of Logged Data	11.64			SD of logged Data	1.524		
687												
688	**Assuming Lognormal Distribution**											
689					95% H-UCL	267.4			90% Chebyshev (MVUE) UCL	291.1		
690					95% Chebyshev (MVUE) UCL	326.7			97.5% Chebyshev (MVUE) UCL	376.1		
691					99% Chebyshev (MVUE) UCL	473.1						
692												
693	**Nonparametric Distribution Free UCL Statistics**											
694	**Data do not follow a Discernible Distribution (0.05)**											
695												
696	**Nonparametric Distribution Free UCLs**											
697					95% CLT UCL	1211			95% Jackknife UCL	1212		
698					95% Standard Bootstrap UCL	1222			95% Bootstrap-t UCL	4078		
699					95% Hall's Bootstrap UCL	3082			95% Percentile Bootstrap UCL	1337		
700					95% BCA Bootstrap UCL	1961						
701					90% Chebyshev(Mean, Sd) UCL	1694			95% Chebyshev(Mean, Sd) UCL	2178		
702					97.5% Chebyshev(Mean, Sd) UCL	2851			99% Chebyshev(Mean, Sd) UCL	4172		
703												
704	**Suggested UCL to Use**											
705					95% Chebyshev (Mean, Sd) UCL	2178						
706												
707	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
708	Recommendations are based upon data size, data distribution, and skewness.											
709	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
710	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
711												
712	**Val_CHROMIUM_HEXAVALENT_COMPOUNDS**											
713												
714	**General Statistics**											
715					Total Number of Observations	109			Number of Distinct Observations	76		
716					Number of Detects	94			Number of Non-Detects	15		
717					Number of Distinct Detects	67			Number of Distinct Non-Detects	13		
718					Minimum Detect	0.32			Minimum Non-Detect	0.43		
719					Maximum Detect	180			Maximum Non-Detect	52		
720					Variance Detects	362			Percent Non-Detects	13.76%		
721					Mean Detects	5.69			SD Detects	19.03		
722					Median Detects	1.9			CV Detects	3.344		
723					Skewness Detects	8.56			Kurtosis Detects	77.99		
724					Mean of Logged Detects	0.812			SD of Logged Detects	1.132		
725												
726	**Normal GOF Test on Detects Only**											
727					Shapiro Wilk Test Statistic	0.249	**Normal GOF Test on Detected Observations Only**					
728					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
729					Lilliefors Test Statistic	0.389	**Lilliefors GOF Test**					
730					5% Lilliefors Critical Value	0.0916	Detected Data Not Normal at 5% Significance Level					
731	**Detected Data Not Normal at 5% Significance Level**											
732												
733	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
734					KM Mean	4.998			KM Standard Error of Mean			1.702
735					KM SD	17.67			95% KM (BCA) UCL			8.225
736					95% KM (t) UCL	7.822			95% KM (Percentile Bootstrap) UCL			8.027
737					95% KM (z) UCL	7.798			95% KM Bootstrap t UCL			16.98
738					90% KM Chebyshev UCL	10.1			95% KM Chebyshev UCL			12.42
739					97.5% KM Chebyshev UCL	15.63			99% KM Chebyshev UCL			21.93
740												
741	**Gamma GOF Tests on Detected Observations Only**											
742					A-D Test Statistic	5.531	**Anderson-Darling GOF Test**					
743					5% A-D Critical Value	0.803	Detected Data Not Gamma Distributed at 5% Significance Level					
744					K-S Test Statistic	0.159	**Kolmogorov-Smirnov GOF**					
745					5% K-S Critical Value	0.0965	Detected Data Not Gamma Distributed at 5% Significance Level					
746	**Detected Data Not Gamma Distributed at 5% Significance Level**											
747												
748	**Gamma Statistics on Detected Data Only**											
749					k hat (MLE)	0.658			k star (bias corrected MLE)			0.644
750					Theta hat (MLE)	8.647			Theta star (bias corrected MLE)			8.834
751					nu hat (MLE)	123.7			nu star (bias corrected)			121.1
752					Mean (detects)	5.69						
753												
754	**Gamma ROS Statistics using Imputed Non-Detects**											
755	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
756	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
757	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
758	This is especially true when the sample size is small.											
759	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
760					Minimum	0.01			Mean			4.908
761					Maximum	180			Median			1.5
762					SD	17.76			CV			3.619
763					k hat (MLE)	0.427			k star (bias corrected MLE)			0.422
764					Theta hat (MLE)	11.49			Theta star (bias corrected MLE)			11.64
765					nu hat (MLE)	93.13			nu star (bias corrected)			91.9
766					Adjusted Level of Significance (β)	0.0478						
767					Approximate Chi Square Value (91.90, α)	70.79			Adjusted Chi Square Value (91.90, β)			70.54
768					95% Gamma Approximate UCL (use when n>=50)	6.372			95% Gamma Adjusted UCL (use when n<50)			6.394
769												
770	**Estimates of Gamma Parameters using KM Estimates**											
771					Mean (KM)	4.998			SD (KM)			17.67
772					Variance (KM)	312.2			SE of Mean (KM)			1.702
773					k hat (KM)	0.08			k star (KM)			0.0839
774					nu hat (KM)	17.44			nu star (KM)			18.29
775					theta hat (KM)	62.47			theta star (KM)			59.55
776					80% gamma percentile (KM)	2.604			90% gamma percentile (KM)			12.2
777					95% gamma percentile (KM)	29.11			99% gamma percentile (KM)			86.52
778												
779	**Gamma Kaplan-Meier (KM) Statistics**											
780					Approximate Chi Square Value (18.29, α)	9.604			Adjusted Chi Square Value (18.29, β)			9.52

	A	B	C	D	E	F	G	H	I	J	K	L
781	95% Gamma Approximate KM-UCL (use when n>=50)					9.52	95% Gamma Adjusted KM-UCL (use when n<50)					9.604
782												
783	**Lognormal GOF Test on Detected Observations Only**											
784	Shapiro Wilk Approximate Test Statistic					0.946	**Shapiro Wilk GOF Test**					
785	5% Shapiro Wilk P Value					0.00179	Detected Data Not Lognormal at 5% Significance Level					
786	Lilliefors Test Statistic					0.0879	**Lilliefors GOF Test**					
787	5% Lilliefors Critical Value					0.0916	Detected Data appear Lognormal at 5% Significance Level					
788	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
789												
790	**Lognormal ROS Statistics Using Imputed Non-Detects**											
791	Mean in Original Scale					4.965	Mean in Log Scale					0.543
792	SD in Original Scale					17.75	SD in Log Scale					1.274
793	95% t UCL (assumes normality of ROS data)					7.786	95% Percentile Bootstrap UCL					8.163
794	95% BCA Bootstrap UCL					10.32	95% Bootstrap t UCL					17.05
795	95% H-UCL (Log ROS)					5.257						
796												
797	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
798	KM Mean (logged)					0.589	KM Geo Mean					1.803
799	KM SD (logged)					1.207	95% Critical H Value (KM-Log)					2.413
800	KM Standard Error of Mean (logged)					0.117	95% H-UCL (KM -Log)					4.943
801	KM SD (logged)					1.207	95% Critical H Value (KM-Log)					2.413
802	KM Standard Error of Mean (logged)					0.117						
803												
804	**DL/2 Statistics**											
805	**DL/2 Normal**						**DL/2 Log-Transformed**					
806	Mean in Original Scale					5.198	Mean in Log Scale					0.582
807	SD in Original Scale					17.86	SD in Log Scale					1.285
808	95% t UCL (Assumes normality)					8.036	95% H-Stat UCL					5.561
809	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
810												
811	**Nonparametric Distribution Free UCL Statistics**											
812	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
813												
814	**Suggested UCL to Use**											
815	KM H-UCL					4.943						
816												
817	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
818	Recommendations are based upon data size, data distribution, and skewness.											
819	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
820	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
821												
822	**Val_COBALT**											
823												
824	**General Statistics**											
825	Total Number of Observations					320	Number of Distinct Observations					217
826	Number of Detects					228	Number of Non-Detects					92
827	Number of Distinct Detects					198	Number of Distinct Non-Detects					30
828	Minimum Detect					0.13	Minimum Non-Detect					3.9
829	Maximum Detect					29300	Maximum Non-Detect					9.2
830	Variance Detects					4517815	Percent Non-Detects					28.75%
831	Mean Detects					346	SD Detects					2126
832	Median Detects					24.1	CV Detects					6.143

	A	B	C	D	E	F	G	H	I	J	K	L
833					Skewness Detects	11.72					Kurtosis Detects	154.4
834					Mean of Logged Detects	3.154					SD of Logged Detects	2.044
835												
836	**Normal GOF Test on Detects Only**											
837					Shapiro Wilk Test Statistic	0.175	**Normal GOF Test on Detected Observations Only**					
838					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
839					Lilliefors Test Statistic	0.446	**Lilliefors GOF Test**					
840					5% Lilliefors Critical Value	0.0591	Detected Data Not Normal at 5% Significance Level					
841	**Detected Data Not Normal at 5% Significance Level**											
842												
843	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
844					KM Mean	247.1					KM Standard Error of Mean	100.7
845					KM SD	1797					95% KM (BCA) UCL	440.2
846					95% KM (t) UCL	413.2					95% KM (Percentile Bootstrap) UCL	442.3
847					95% KM (z) UCL	412.7					95% KM Bootstrap t UCL	696.2
848					90% KM Chebyshev UCL	549.2					95% KM Chebyshev UCL	686
849					97.5% KM Chebyshev UCL	875.8					99% KM Chebyshev UCL	1249
850												
851	**Gamma GOF Tests on Detected Observations Only**											
852					A-D Test Statistic	24.86	**Anderson-Darling GOF Test**					
853					5% A-D Critical Value	0.889	Detected Data Not Gamma Distributed at 5% Significance Level					
854					K-S Test Statistic	0.262	**Kolmogorov-Smirnov GOF**					
855					5% K-S Critical Value	0.0662	Detected Data Not Gamma Distributed at 5% Significance Level					
856	**Detected Data Not Gamma Distributed at 5% Significance Level**											
857												
858	**Gamma Statistics on Detected Data Only**											
859					k hat (MLE)	0.262	k star (bias corrected MLE)					0.261
860					Theta hat (MLE)	1322	Theta star (bias corrected MLE)					1324
861					nu hat (MLE)	119.4	nu star (bias corrected)					119.2
862					Mean (detects)	346						
863												
864	**Gamma ROS Statistics using Imputed Non-Detects**											
865	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
866	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
867	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
868	This is especially true when the sample size is small.											
869	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
870					Minimum	0.01	Mean					246.5
871					Maximum	29300	Median					8.4
872					SD	1800	CV					7.301
873					k hat (MLE)	0.165	k star (bias corrected MLE)					0.166
874					Theta hat (MLE)	1492	Theta star (bias corrected MLE)					1487
875					nu hat (MLE)	105.8	nu star (bias corrected)					106.1
876					Adjusted Level of Significance (β)	0.0493						
877					Approximate Chi Square Value (106.12, α)	83.34	Adjusted Chi Square Value (106.12, β)					83.25
878					95% Gamma Approximate UCL (use when n>=50)	313.9	95% Gamma Adjusted UCL (use when n<50)					314.2
879												
880	**Estimates of Gamma Parameters using KM Estimates**											
881					Mean (KM)	247.1	SD (KM)					1797
882					Variance (KM)	3229053	SE of Mean (KM)					100.7
883					k hat (KM)	0.0189	k star (KM)					0.0208
884					nu hat (KM)	12.11	nu star (KM)					13.33

885					theta hat (KM)	13066					theta star (KM)	11870
886					80% gamma percentile (KM)	0.15					90% gamma percentile (KM)	43.16
887					95% gamma percentile (KM)	606.3					99% gamma percentile (KM)	6872
888												
889	**Gamma Kaplan-Meier (KM) Statistics**											
890					Approximate Chi Square Value (13.33, α)	6.112					Adjusted Chi Square Value (13.33, β)	6.09
891					95% Gamma Approximate KM-UCL (use when n>=50)	538.8					95% Gamma Adjusted KM-UCL (use when n<50)	540.8
892												
893	**Lognormal GOF Test on Detected Observations Only**											
894					Shapiro Wilk Approximate Test Statistic	0.975	**Shapiro Wilk GOF Test**					
895					5% Shapiro Wilk P Value	0.0595	Detected Data appear Lognormal at 5% Significance Level					
896					Lilliefors Test Statistic	0.0588	**Lilliefors GOF Test**					
897					5% Lilliefors Critical Value	0.0591	Detected Data appear Lognormal at 5% Significance Level					
898	**Detected Data appear Lognormal at 5% Significance Level**											
899												
900	**Lognormal ROS Statistics Using Imputed Non-Detects**											
901					Mean in Original Scale	247.1					Mean in Log Scale	2.376
902					SD in Original Scale	1800					SD in Log Scale	2.162
903					95% t UCL (assumes normality of ROS data)	413.1					95% Percentile Bootstrap UCL	440
904					95% BCA Bootstrap UCL	550.7					95% Bootstrap t UCL	727
905					95% H-UCL (Log ROS)	165.6						
906												
907	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
908					KM Mean (logged)	2.369					KM Geo Mean	10.68
909					KM SD (logged)	2.175					95% Critical H Value (KM-Log)	3.285
910					KM Standard Error of Mean (logged)	0.13					95% H-UCL (KM -Log)	169.7
911					KM SD (logged)	2.175					95% Critical H Value (KM-Log)	3.285
912					KM Standard Error of Mean (logged)	0.13						
913												
914	**DL/2 Statistics**											
915	**DL/2 Normal**						**DL/2 Log-Transformed**					
916					Mean in Original Scale	247.3					Mean in Log Scale	2.525
917					SD in Original Scale	1800					SD in Log Scale	1.991
918					95% t UCL (Assumes normality)	413.3					95% H-Stat UCL	127.9
919	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
920												
921	**Nonparametric Distribution Free UCL Statistics**											
922	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
923												
924	**Suggested UCL to Use**											
925					KM H-UCL	169.7						
926												
927	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
928	Recommendations are based upon data size, data distribution, and skewness.											
929	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
930	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
931												
932	**Val_COPPER**											
933												
934	**General Statistics**											
935					Total Number of Observations	320					Number of Distinct Observations	294
936					Number of Detects	319					Number of Non-Detects	1

937					Number of Distinct Detects	294					Number of Distinct Non-Detects	1
938					Minimum Detect	2					Minimum Non-Detect	2.9
939					Maximum Detect	183000					Maximum Non-Detect	2.9
940					Variance Detects	1.155E+8					Percent Non-Detects	0.313%
941					Mean Detects	2291					SD Detects	10747
942					Median Detects	292					CV Detects	4.691
943					Skewness Detects	15.18					Kurtosis Detects	253.4
944					Mean of Logged Detects	5.394					SD of Logged Detects	2.519
945												
946					**Normal GOF Test on Detects Only**							
947					Shapiro Wilk Test Statistic	0.198					**Normal GOF Test on Detected Observations Only**	
948					5% Shapiro Wilk P Value	0					Detected Data Not Normal at 5% Significance Level	
949					Lilliefors Test Statistic	0.416					**Lilliefors GOF Test**	
950					5% Lilliefors Critical Value	0.05					Detected Data Not Normal at 5% Significance Level	
951					**Detected Data Not Normal at 5% Significance Level**							
952												
953					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
954					KM Mean	2284					KM Standard Error of Mean	599.9
955					KM SD	10714					95% KM (BCA) UCL	3593
956					95% KM (t) UCL	3274					95% KM (Percentile Bootstrap) UCL	3337
957					95% KM (z) UCL	3271					95% KM Bootstrap t UCL	4991
958					90% KM Chebyshev UCL	4084					95% KM Chebyshev UCL	4899
959					97.5% KM Chebyshev UCL	6030					99% KM Chebyshev UCL	8253
960												
961					**Gamma GOF Tests on Detected Observations Only**							
962					A-D Test Statistic	8.5					**Anderson-Darling GOF Test**	
963					5% A-D Critical Value	0.873					Detected Data Not Gamma Distributed at 5% Significance Level	
964					K-S Test Statistic	0.113					**Kolmogorov-Smirnov GOF**	
965					5% K-S Critical Value	0.0552					Detected Data Not Gamma Distributed at 5% Significance Level	
966					**Detected Data Not Gamma Distributed at 5% Significance Level**							
967												
968					**Gamma Statistics on Detected Data Only**							
969					k hat (MLE)	0.295					k star (bias corrected MLE)	0.294
970					Theta hat (MLE)	7765					Theta star (bias corrected MLE)	7783
971					nu hat (MLE)	188.3					nu star (bias corrected)	187.8
972					Mean (detects)	2291						
973												
974					**Gamma ROS Statistics using Imputed Non-Detects**							
975					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
976					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
977					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
978					This is especially true when the sample size is small.							
979					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
980					Minimum	0.01					Mean	2284
981					Maximum	183000					Median	278
982					SD	10731					CV	4.698
983					k hat (MLE)	0.292					k star (bias corrected MLE)	0.291
984					Theta hat (MLE)	7820					Theta star (bias corrected MLE)	7838
985					nu hat (MLE)	186.9					nu star (bias corrected)	186.5
986					Adjusted Level of Significance (β)	0.0493						
987					Approximate Chi Square Value (186.50, α)	155.9					Adjusted Chi Square Value (186.50, β)	155.8
988					95% Gamma Approximate UCL (use when n>=50)	2732					95% Gamma Adjusted UCL (use when n<50)	2734

989												
990	**Estimates of Gamma Parameters using KM Estimates**											
991					Mean (KM)	2284				SD (KM)	10714	
992					Variance (KM)	1.148E+8				SE of Mean (KM)	599.9	
993					k hat (KM)	0.0454				k star (KM)	0.0471	
994					nu hat (KM)	29.08				nu star (KM)	30.14	
995					theta hat (KM)	50262				theta star (KM)	48494	
996					80% gamma percentile (KM)	248.9				90% gamma percentile (KM)	3214	
997					95% gamma percentile (KM)	11871				99% gamma percentile (KM)	50853	
998												
999	**Gamma Kaplan-Meier (KM) Statistics**											
1000					Approximate Chi Square Value (30.14, α)	18.61				Adjusted Chi Square Value (30.14, β)	18.56	
1001					95% Gamma Approximate KM-UCL (use when n>=50)	3700				95% Gamma Adjusted KM-UCL (use when n<50)	3709	
1002												
1003	**Lognormal GOF Test on Detected Observations Only**											
1004					Shapiro Wilk Approximate Test Statistic	0.93				**Shapiro Wilk GOF Test**		
1005					5% Shapiro Wilk P Value	0				Detected Data Not Lognormal at 5% Significance Level		
1006					Lilliefors Test Statistic	0.105				**Lilliefors GOF Test**		
1007					5% Lilliefors Critical Value	0.05				Detected Data Not Lognormal at 5% Significance Level		
1008	**Detected Data Not Lognormal at 5% Significance Level**											
1009												
1010	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1011					Mean in Original Scale	2284				Mean in Log Scale	5.373	
1012					SD in Original Scale	10731				SD in Log Scale	2.542	
1013					95% t UCL (assumes normality of ROS data)	3274				95% Percentile Bootstrap UCL	3433	
1014					95% BCA Bootstrap UCL	4102				95% Bootstrap t UCL	5105	
1015					95% H-UCL (Log ROS)	9213						
1016												
1017	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1018					KM Mean (logged)	5.379				KM Geo Mean	216.8	
1019					KM SD (logged)	2.524				95% Critical H Value (KM-Log)	3.67	
1020					KM Standard Error of Mean (logged)	0.141				95% H-UCL (KM -Log)	8814	
1021					KM SD (logged)	2.524				95% Critical H Value (KM-Log)	3.67	
1022					KM Standard Error of Mean (logged)	0.141						
1023												
1024	**DL/2 Statistics**											
1025					**DL/2 Normal**					**DL/2 Log-Transformed**		
1026					Mean in Original Scale	2284				Mean in Log Scale	5.378	
1027					SD in Original Scale	10731				SD in Log Scale	2.531	
1028					95% t UCL (Assumes normality)	3274				95% H-Stat UCL	8968	
1029	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1030												
1031	**Nonparametric Distribution Free UCL Statistics**											
1032	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1033												
1034	**Suggested UCL to Use**											
1035					95% KM (Chebyshev) UCL	4899						
1036												
1037	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1038	Recommendations are based upon data size, data distribution, and skewness.											
1039	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1040	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
1041												
1042	**Val_CYANIDE**											
1043												
1044	**General Statistics**											
1045					Total Number of Observations	320			Number of Distinct Observations	67		
1046					Number of Detects	62			Number of Non-Detects	258		
1047					Number of Distinct Detects	45			Number of Distinct Non-Detects	35		
1048					Minimum Detect	0.15			Minimum Non-Detect	0.5		
1049					Maximum Detect	9.2			Maximum Non-Detect	1.5		
1050					Variance Detects	1.651			Percent Non-Detects	80.63%		
1051					Mean Detects	0.799			SD Detects	1.285		
1052					Median Detects	0.49			CV Detects	1.608		
1053					Skewness Detects	5.116			Kurtosis Detects	30.92		
1054					Mean of Logged Detects	-0.694			SD of Logged Detects	0.844		
1055												
1056	**Normal GOF Test on Detects Only**											
1057					Shapiro Wilk Test Statistic	0.467		**Normal GOF Test on Detected Observations Only**				
1058					5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level				
1059					Lilliefors Test Statistic	0.321		**Lilliefors GOF Test**				
1060					5% Lilliefors Critical Value	0.112		Detected Data Not Normal at 5% Significance Level				
1061	**Detected Data Not Normal at 5% Significance Level**											
1062												
1063	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1064					KM Mean	0.39			KM Standard Error of Mean	0.0368		
1065					KM SD	0.604			95% KM (BCA) UCL	0.461		
1066					95% KM (t) UCL	0.451			95% KM (Percentile Bootstrap) UCL	0.454		
1067					95% KM (z) UCL	0.451			95% KM Bootstrap t UCL	0.483		
1068					90% KM Chebyshev UCL	0.501			95% KM Chebyshev UCL	0.55		
1069					97.5% KM Chebyshev UCL	0.62			99% KM Chebyshev UCL	0.756		
1070												
1071	**Gamma GOF Tests on Detected Observations Only**											
1072					A-D Test Statistic	3.123		**Anderson-Darling GOF Test**				
1073					5% A-D Critical Value	0.775		Detected Data Not Gamma Distributed at 5% Significance Level				
1074					K-S Test Statistic	0.176		**Kolmogorov-Smirnov GOF**				
1075					5% K-S Critical Value	0.116		Detected Data Not Gamma Distributed at 5% Significance Level				
1076	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1077												
1078	**Gamma Statistics on Detected Data Only**											
1079					k hat (MLE)	1.205			k star (bias corrected MLE)	1.157		
1080					Theta hat (MLE)	0.663			Theta star (bias corrected MLE)	0.69		
1081					nu hat (MLE)	149.4			nu star (bias corrected)	143.5		
1082					Mean (detects)	0.799						
1083												
1084	**Gamma ROS Statistics using Imputed Non-Detects**											
1085	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1086	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1087	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1088	This is especially true when the sample size is small.											
1089	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1090					Minimum	0.01			Mean	0.297		
1091					Maximum	9.2			Median	0.111		
1092					SD	0.651			CV	2.19		

1093					k hat (MLE)	0.482				k star (bias corrected MLE)		0.479
1094					Theta hat (MLE)	0.617				Theta star (bias corrected MLE)		0.62
1095					nu hat (MLE)	308.2				nu star (bias corrected)		306.6
1096					Adjusted Level of Significance (β)	0.0493						
1097					Approximate Chi Square Value (306.63, α)	267.1				Adjusted Chi Square Value (306.63, β)		266.9
1098					95% Gamma Approximate UCL (use when n>=50)	0.341				95% Gamma Adjusted UCL (use when n<50)		0.341
1099												
1100	**Estimates of Gamma Parameters using KM Estimates**											
1101					Mean (KM)	0.39				SD (KM)		0.604
1102					Variance (KM)	0.365				SE of Mean (KM)		0.0368
1103					k hat (KM)	0.418				k star (KM)		0.416
1104					nu hat (KM)	267.3				nu star (KM)		266.2
1105					theta hat (KM)	0.934				theta star (KM)		0.938
1106					80% gamma percentile (KM)	0.632				90% gamma percentile (KM)		1.094
1107					95% gamma percentile (KM)	1.6				99% gamma percentile (KM)		2.864
1108												
1109	**Gamma Kaplan-Meier (KM) Statistics**											
1110					Approximate Chi Square Value (266.16, α)	229.4				Adjusted Chi Square Value (266.16, β)		229.2
1111					95% Gamma Approximate KM-UCL (use when n>=50)	0.453				95% Gamma Adjusted KM-UCL (use when n<50)		0.453
1112												
1113	**Lognormal GOF Test on Detected Observations Only**											
1114					Shapiro Wilk Approximate Test Statistic	0.931	**Shapiro Wilk GOF Test**					
1115					5% Shapiro Wilk P Value	0.00219	Detected Data Not Lognormal at 5% Significance Level					
1116					Lilliefors Test Statistic	0.0952	**Lilliefors GOF Test**					
1117					5% Lilliefors Critical Value	0.112	Detected Data appear Lognormal at 5% Significance Level					
1118	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
1119												
1120	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1121					Mean in Original Scale	0.404				Mean in Log Scale		-1.168
1122					SD in Original Scale	0.608				SD in Log Scale		0.611
1123					95% t UCL (assumes normality of ROS data)	0.46				95% Percentile Bootstrap UCL		0.469
1124					95% BCA Bootstrap UCL	0.488				95% Bootstrap t UCL		0.515
1125					95% H-UCL (Log ROS)	0.399						
1126												
1127	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1128					KM Mean (logged)	-1.18				KM Geo Mean		0.307
1129					KM SD (logged)	0.546				95% Critical H Value (KM-Log)		1.815
1130					KM Standard Error of Mean (logged)	0.058				95% H-UCL (KM -Log)		0.377
1131					KM SD (logged)	0.546				95% Critical H Value (KM-Log)		1.815
1132					KM Standard Error of Mean (logged)	0.058						
1133												
1134	**DL/2 Statistics**											
1135	**DL/2 Normal**						**DL/2 Log-Transformed**					
1136					Mean in Original Scale	0.404				Mean in Log Scale		-1.088
1137					SD in Original Scale	0.596				SD in Log Scale		0.431
1138					95% t UCL (Assumes normality)	0.459				95% H-Stat UCL		0.386
1139	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1140												
1141	**Nonparametric Distribution Free UCL Statistics**											
1142	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
1143												
1144	**Suggested UCL to Use**											

	A	B	C	D	E	F	G	H	I	J	K	L
1145					KM H-UCL	0.377						
1146												
1147	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1148	Recommendations are based upon data size, data distribution, and skewness.											
1149	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1150	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1151												
1152												
1153	**Val_IRON**											
1154												
1155	**General Statistics**											
1156					Total Number of Observations	320				Number of Distinct Observations	271	
1157										Number of Missing Observations	0	
1158					Minimum	1780				Mean	49120	
1159					Maximum	1580000				Median	20000	
1160					SD	102394				Std. Error of Mean	5724	
1161					Coefficient of Variation	2.085				Skewness	10.84	
1162												
1163	**Normal GOF Test**											
1164					Shapiro Wilk Test Statistic	0.401	**Shapiro Wilk GOF Test**					
1165					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
1166					Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**					
1167					5% Lilliefors Critical Value	0.0499	Data Not Normal at 5% Significance Level					
1168	**Data Not Normal at 5% Significance Level**											
1169												
1170	**Assuming Normal Distribution**											
1171	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1172					95% Student's-t UCL	58563				95% Adjusted-CLT UCL (Chen-1995)	62241	
1173										95% Modified-t UCL (Johnson-1978)	59141	
1174												
1175	**Gamma GOF Test**											
1176					A-D Test Statistic	11.27	**Anderson-Darling Gamma GOF Test**					
1177					5% A-D Critical Value	0.793	Data Not Gamma Distributed at 5% Significance Level					
1178					K-S Test Statistic	0.144	**Kolmogorov-Smirnov Gamma GOF Test**					
1179					5% K-S Critical Value	0.0526	Data Not Gamma Distributed at 5% Significance Level					
1180	**Data Not Gamma Distributed at 5% Significance Level**											
1181												
1182	**Gamma Statistics**											
1183					k hat (MLE)	0.82				k star (bias corrected MLE)	0.814	
1184					Theta hat (MLE)	59915				Theta star (bias corrected MLE)	60327	
1185					nu hat (MLE)	524.7				nu star (bias corrected)	521.1	
1186					MLE Mean (bias corrected)	49120				MLE Sd (bias corrected)	54436	
1187										Approximate Chi Square Value (0.05)	469.2	
1188					Adjusted Level of Significance	0.0493				Adjusted Chi Square Value	468.9	
1189												
1190	**Assuming Gamma Distribution**											
1191					95% Approximate Gamma UCL (use when n>=50))	54558				95% Adjusted Gamma UCL (use when n<50)	54583	
1192												
1193	**Lognormal GOF Test**											
1194					Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**					
1195					5% Shapiro Wilk P Value	8.5601E-7	Data Not Lognormal at 5% Significance Level					
1196					Lilliefors Test Statistic	0.0803	**Lilliefors Lognormal GOF Test**					

1197				5% Lilliefors Critical Value		0.0499	Data Not Lognormal at 5% Significance Level					
1198	**Data Not Lognormal at 5% Significance Level**											
1199												
1200	**Lognormal Statistics**											
1201				Minimum of Logged Data		7.484			Mean of logged Data			10.08
1202				Maximum of Logged Data		14.27			SD of logged Data			1.131
1203												
1204	**Assuming Lognormal Distribution**											
1205				95% H-UCL		52135			90% Chebyshev (MVUE) UCL			55990
1206				95% Chebyshev (MVUE) UCL		60913			97.5% Chebyshev (MVUE) UCL			67745
1207				99% Chebyshev (MVUE) UCL		81166						
1208												
1209	**Nonparametric Distribution Free UCL Statistics**											
1210	**Data do not follow a Discernible Distribution (0.05)**											
1211												
1212	**Nonparametric Distribution Free UCLs**											
1213				95% CLT UCL		58535			95% Jackknife UCL			58563
1214				95% Standard Bootstrap UCL		58420			95% Bootstrap-t UCL			65406
1215				95% Hall's Bootstrap UCL		101106			95% Percentile Bootstrap UCL			59470
1216				95% BCA Bootstrap UCL		64584						
1217				90% Chebyshev(Mean, Sd) UCL		66292			95% Chebyshev(Mean, Sd) UCL			74070
1218				97.5% Chebyshev(Mean, Sd) UCL		84866			99% Chebyshev(Mean, Sd) UCL			106073
1219												
1220	**Suggested UCL to Use**											
1221				95% Chebyshev (Mean, Sd) UCL		74070						
1222												
1223	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1224	Recommendations are based upon data size, data distribution, and skewness.											
1225	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1226	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1227												
1228												
1229	**Val_LEAD**											
1230												
1231	**General Statistics**											
1232				Total Number of Observations		320			Number of Distinct Observations			292
1233									Number of Missing Observations			0
1234				Minimum		2.7			Mean			1614
1235				Maximum		121000			Median			291
1236				SD		7145			Std. Error of Mean			399.4
1237				Coefficient of Variation		4.428			Skewness			14.88
1238												
1239	**Normal GOF Test**											
1240				Shapiro Wilk Test Statistic		0.209	**Shapiro Wilk GOF Test**					
1241				5% Shapiro Wilk P Value		0	Data Not Normal at 5% Significance Level					
1242				Lilliefors Test Statistic		0.411	**Lilliefors GOF Test**					
1243				5% Lilliefors Critical Value		0.0499	Data Not Normal at 5% Significance Level					
1244	**Data Not Normal at 5% Significance Level**											
1245												
1246	**Assuming Normal Distribution**											
1247	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1248				95% Student's-t UCL		2273			95% Adjusted-CLT UCL (Chen-1995)			2626

1249								95% Modified-t UCL (Johnson-1978)				2328
1250												
1251	**Gamma GOF Test**											
1252					A-D Test Statistic	7.418	**Anderson-Darling Gamma GOF Test**					
1253					5% A-D Critical Value	0.862	Data Not Gamma Distributed at 5% Significance Level					
1254					K-S Test Statistic	0.102	**Kolmogorov-Smirnov Gamma GOF Test**					
1255					5% K-S Critical Value	0.0548	Data Not Gamma Distributed at 5% Significance Level					
1256	**Data Not Gamma Distributed at 5% Significance Level**											
1257												
1258	**Gamma Statistics**											
1259					k hat (MLE)	0.337	k star (bias corrected MLE)					0.336
1260					Theta hat (MLE)	4786	Theta star (bias corrected MLE)					4801
1261					nu hat (MLE)	215.8	nu star (bias corrected)					215.1
1262					MLE Mean (bias corrected)	1614	MLE Sd (bias corrected)					2783
1263							Approximate Chi Square Value (0.05)					182.1
1264					Adjusted Level of Significance	0.0493	Adjusted Chi Square Value					182
1265												
1266	**Assuming Gamma Distribution**											
1267					95% Approximate Gamma UCL (use when n>=50))	1905	95% Adjusted Gamma UCL (use when n<50)					1907
1268												
1269	**Lognormal GOF Test**											
1270					Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**					
1271					5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level					
1272					Lilliefors Test Statistic	0.0826	**Lilliefors Lognormal GOF Test**					
1273					5% Lilliefors Critical Value	0.0499	Data Not Lognormal at 5% Significance Level					
1274	**Data Not Lognormal at 5% Significance Level**											
1275												
1276	**Lognormal Statistics**											
1277					Minimum of Logged Data	0.993	Mean of logged Data					5.38
1278					Maximum of Logged Data	11.7	SD of logged Data					2.254
1279												
1280	**Assuming Lognormal Distribution**											
1281					95% H-UCL	4211	90% Chebyshev (MVUE) UCL					4503
1282					95% Chebyshev (MVUE) UCL	5329	97.5% Chebyshev (MVUE) UCL					6477
1283					99% Chebyshev (MVUE) UCL	8731						
1284												
1285	**Nonparametric Distribution Free UCL Statistics**											
1286	**Data do not follow a Discernible Distribution (0.05)**											
1287												
1288	**Nonparametric Distribution Free UCLs**											
1289					95% CLT UCL	2271	95% Jackknife UCL					2273
1290					95% Standard Bootstrap UCL	2253	95% Bootstrap-t UCL					3350
1291					95% Hall's Bootstrap UCL	4739	95% Percentile Bootstrap UCL					2397
1292					95% BCA Bootstrap UCL	3057						
1293					90% Chebyshev(Mean, Sd) UCL	2812	95% Chebyshev(Mean, Sd) UCL					3355
1294					97.5% Chebyshev(Mean, Sd) UCL	4108	99% Chebyshev(Mean, Sd) UCL					5588
1295												
1296	**Suggested UCL to Use**											
1297					95% Chebyshev (Mean, Sd) UCL	3355						
1298												
1299	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1300	Recommendations are based upon data size, data distribution, and skewness.											

1301	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1302	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1303												
1304												
1305	**Val_MANGANESE**											
1306												
1307	**General Statistics**											
1308					Total Number of Observations	320			Number of Distinct Observations	282		
1309									Number of Missing Observations	0		
1310					Minimum	3			Mean	355.7		
1311					Maximum	2660			Median	193		
1312					SD	437.8			Std. Error of Mean	24.47		
1313					Coefficient of Variation	1.231			Skewness	1.834		
1314												
1315	**Normal GOF Test**											
1316					Shapiro Wilk Test Statistic	0.768			**Shapiro Wilk GOF Test**			
1317					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
1318					Lilliefors Test Statistic	0.21			**Lilliefors GOF Test**			
1319					5% Lilliefors Critical Value	0.0499			Data Not Normal at 5% Significance Level			
1320	**Data Not Normal at 5% Significance Level**											
1321												
1322	**Assuming Normal Distribution**											
1323					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
1324					95% Student's-t UCL	396.1			95% Adjusted-CLT UCL (Chen-1995)	398.6		
1325									95% Modified-t UCL (Johnson-1978)	396.5		
1326												
1327	**Gamma GOF Test**											
1328					A-D Test Statistic	3.149			**Anderson-Darling Gamma GOF Test**			
1329					5% A-D Critical Value	0.805			Data Not Gamma Distributed at 5% Significance Level			
1330					K-S Test Statistic	0.0922			**Kolmogorov-Smirnov Gamma GOF Test**			
1331					5% K-S Critical Value	0.053			Data Not Gamma Distributed at 5% Significance Level			
1332	**Data Not Gamma Distributed at 5% Significance Level**											
1333												
1334	**Gamma Statistics**											
1335					k hat (MLE)	0.67			k star (bias corrected MLE)	0.666		
1336					Theta hat (MLE)	530.5			Theta star (bias corrected MLE)	533.9		
1337					nu hat (MLE)	429.1			nu star (bias corrected)	426.4		
1338					MLE Mean (bias corrected)	355.7			MLE Sd (bias corrected)	435.8		
1339									Approximate Chi Square Value (0.05)	379.5		
1340					Adjusted Level of Significance	0.0493			Adjusted Chi Square Value	379.3		
1341												
1342	**Assuming Gamma Distribution**											
1343					95% Approximate Gamma UCL (use when n>=50))	399.6			95% Adjusted Gamma UCL (use when n<50)	399.8		
1344												
1345	**Lognormal GOF Test**											
1346					Shapiro Wilk Test Statistic	0.938			**Shapiro Wilk Lognormal GOF Test**			
1347					5% Shapiro Wilk P Value	0			Data Not Lognormal at 5% Significance Level			
1348					Lilliefors Test Statistic	0.0898			**Lilliefors Lognormal GOF Test**			
1349					5% Lilliefors Critical Value	0.0499			Data Not Lognormal at 5% Significance Level			
1350	**Data Not Lognormal at 5% Significance Level**											
1351												
1352	**Lognormal Statistics**											

1353					Minimum of Logged Data	1.099				Mean of logged Data		4.967
1354					Maximum of Logged Data	7.886				SD of logged Data		1.534
1355												
1356					**Assuming Lognormal Distribution**							
1357					95% H-UCL	583				90% Chebyshev (MVUE) UCL		635
1358					95% Chebyshev (MVUE) UCL	713.2				97.5% Chebyshev (MVUE) UCL		821.7
1359					99% Chebyshev (MVUE) UCL	1035						
1360												
1361					**Nonparametric Distribution Free UCL Statistics**							
1362					**Data do not follow a Discernible Distribution (0.05)**							
1363												
1364					**Nonparametric Distribution Free UCLs**							
1365					95% CLT UCL	396				95% Jackknife UCL		396.1
1366					95% Standard Bootstrap UCL	396				95% Bootstrap-t UCL		399
1367					95% Hall's Bootstrap UCL	398.2				95% Percentile Bootstrap UCL		396.1
1368					95% BCA Bootstrap UCL	401.6						
1369					90% Chebyshev(Mean, Sd) UCL	429.1				95% Chebyshev(Mean, Sd) UCL		462.4
1370					97.5% Chebyshev(Mean, Sd) UCL	508.6				99% Chebyshev(Mean, Sd) UCL		599.2
1371												
1372					**Suggested UCL to Use**							
1373					95% Chebyshev (Mean, Sd) UCL	462.4						
1374												
1375	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1376	Recommendations are based upon data size, data distribution, and skewness.											
1377	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1378	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1379												
1380	**Val_MERCURY**											
1381												
1382					**General Statistics**							
1383					Total Number of Observations	316				Number of Distinct Observations		163
1384					Number of Detects	253				Number of Non-Detects		63
1385					Number of Distinct Detects	163				Number of Distinct Non-Detects		8
1386					Minimum Detect	0.004				Minimum Non-Detect		0.099
1387					Maximum Detect	93.3				Maximum Non-Detect		0.2
1388					Variance Detects	70.13				Percent Non-Detects		19.94%
1389					Mean Detects	3.379				SD Detects		8.374
1390					Median Detects	1.1				CV Detects		2.478
1391					Skewness Detects	7.884				Kurtosis Detects		75.5
1392					Mean of Logged Detects	-0.2				SD of Logged Detects		1.921
1393												
1394					**Normal GOF Test on Detects Only**							
1395					Shapiro Wilk Test Statistic	0.386				**Normal GOF Test on Detected Observations Only**		
1396					5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level		
1397					Lilliefors Test Statistic	0.343				**Lilliefors GOF Test**		
1398					5% Lilliefors Critical Value	0.0561				Detected Data Not Normal at 5% Significance Level		
1399					**Detected Data Not Normal at 5% Significance Level**							
1400												
1401					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1402					KM Mean	2.714				KM Standard Error of Mean		0.428
1403					KM SD	7.596				95% KM (BCA) UCL		3.533
1404					95% KM (t) UCL	3.42				95% KM (Percentile Bootstrap) UCL		3.461

	A	B	C	D	E	F	G	H	I	J	K	L
1405					95% KM (z) UCL	3.418				95% KM Bootstrap t UCL		3.954
1406					90% KM Chebyshev UCL	3.999				95% KM Chebyshev UCL		4.58
1407					97.5% KM Chebyshev UCL	5.388				99% KM Chebyshev UCL		6.974
1408												
1409	**Gamma GOF Tests on Detected Observations Only**											
1410					A-D Test Statistic	2.878	**Anderson-Darling GOF Test**					
1411					5% A-D Critical Value	0.832	Detected Data Not Gamma Distributed at 5% Significance Level					
1412					K-S Test Statistic	0.0907	**Kolmogorov-Smirnov GOF**					
1413					5% K-S Critical Value	0.0612	Detected Data Not Gamma Distributed at 5% Significance Level					
1414	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1415												
1416	**Gamma Statistics on Detected Data Only**											
1417					k hat (MLE)	0.455				k star (bias corrected MLE)		0.452
1418					Theta hat (MLE)	7.432				Theta star (bias corrected MLE)		7.477
1419					nu hat (MLE)	230.1				nu star (bias corrected)		228.7
1420					Mean (detects)	3.379						
1421												
1422	**Gamma ROS Statistics using Imputed Non-Detects**											
1423	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1424	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1425	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1426	This is especially true when the sample size is small.											
1427	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1428					Minimum	0.004				Mean		2.707
1429					Maximum	93.3				Median		0.475
1430					SD	7.611				CV		2.811
1431					k hat (MLE)	0.328				k star (bias corrected MLE)		0.327
1432					Theta hat (MLE)	8.263				Theta star (bias corrected MLE)		8.288
1433					nu hat (MLE)	207.1				nu star (bias corrected)		206.4
1434					Adjusted Level of Significance (β)	0.0492						
1435					Approximate Chi Square Value (206.44, α)	174.2				Adjusted Chi Square Value (206.44, β)		174.1
1436					95% Gamma Approximate UCL (use when n>=50)	3.209				95% Gamma Adjusted UCL (use when n<50)		3.211
1437												
1438	**Estimates of Gamma Parameters using KM Estimates**											
1439					Mean (KM)	2.714				SD (KM)		7.596
1440					Variance (KM)	57.7				SE of Mean (KM)		0.428
1441					k hat (KM)	0.128				k star (KM)		0.129
1442					nu hat (KM)	80.68				nu star (KM)		81.25
1443					theta hat (KM)	21.26				theta star (KM)		21.11
1444					80% gamma percentile (KM)	2.564				90% gamma percentile (KM)		7.824
1445					95% gamma percentile (KM)	15.34				99% gamma percentile (KM)		37.9
1446												
1447	**Gamma Kaplan-Meier (KM) Statistics**											
1448					Approximate Chi Square Value (81.25, α)	61.48				Adjusted Chi Square Value (81.25, β)		61.4
1449					95% Gamma Approximate KM-UCL (use when n>=50)	3.587				95% Gamma Adjusted KM-UCL (use when n<50)		3.592
1450												
1451	**Lognormal GOF Test on Detected Observations Only**											
1452					Shapiro Wilk Approximate Test Statistic	0.966	**Shapiro Wilk GOF Test**					
1453					5% Shapiro Wilk P Value	9.4493E-4	Detected Data Not Lognormal at 5% Significance Level					
1454					Lilliefors Test Statistic	0.0671	**Lilliefors GOF Test**					
1455					5% Lilliefors Critical Value	0.0561	Detected Data Not Lognormal at 5% Significance Level					
1456	**Detected Data Not Lognormal at 5% Significance Level**											

1457												
1458	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1459					Mean in Original Scale	2.717			Mean in Log Scale	-0.786		
1460					SD in Original Scale	7.607			SD in Log Scale	2.123		
1461					95% t UCL (assumes normality of ROS data)	3.423			95% Percentile Bootstrap UCL	3.483		
1462					95% BCA Bootstrap UCL	3.757			95% Bootstrap t UCL	3.989		
1463					95% H-UCL (Log ROS)	6.389						
1464												
1465	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1466					KM Mean (logged)	-0.838			KM Geo Mean	0.433		
1467					KM SD (logged)	2.168			95% Critical H Value (KM-Log)	3.276		
1468					KM Standard Error of Mean (logged)	0.126			95% H-UCL (KM -Log)	6.768		
1469					KM SD (logged)	2.168			95% Critical H Value (KM-Log)	3.276		
1470					KM Standard Error of Mean (logged)	0.126						
1471												
1472	**DL/2 Statistics**											
1473					**DL/2 Normal**				**DL/2 Log-Transformed**			
1474					Mean in Original Scale	2.717			Mean in Log Scale	-0.723		
1475					SD in Original Scale	7.607			SD in Log Scale	2.014		
1476					95% t UCL (Assumes normality)	3.423			95% H-Stat UCL	5.246		
1477	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1478												
1479	**Nonparametric Distribution Free UCL Statistics**											
1480	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1481												
1482	**Suggested UCL to Use**											
1483					95% KM (Chebyshev) UCL	4.58						
1484												
1485	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1486	Recommendations are based upon data size, data distribution, and skewness.											
1487	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1488	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1489												
1490	**Val_NICKEL**											
1491												
1492	**General Statistics**											
1493					Total Number of Observations	320			Number of Distinct Observations	271		
1494					Number of Detects	305			Number of Non-Detects	15		
1495					Number of Distinct Detects	267			Number of Distinct Non-Detects	8		
1496					Minimum Detect	1			Minimum Non-Detect	4.4		
1497					Maximum Detect	18200			Maximum Non-Detect	5.4		
1498					Variance Detects	1315962			Percent Non-Detects	4.688%		
1499					Mean Detects	314.1			SD Detects	1147		
1500					Median Detects	75.5			CV Detects	3.653		
1501					Skewness Detects	12.91			Kurtosis Detects	196.2		
1502					Mean of Logged Detects	4.131			SD of Logged Detects	1.88		
1503												
1504	**Normal GOF Test on Detects Only**											
1505					Shapiro Wilk Test Statistic	0.261			**Normal GOF Test on Detected Observations Only**			
1506					5% Shapiro Wilk P Value	0			Detected Data Not Normal at 5% Significance Level			
1507					Lilliefors Test Statistic	0.392			**Lilliefors GOF Test**			
1508					5% Lilliefors Critical Value	0.0511			Detected Data Not Normal at 5% Significance Level			

1509	**Detected Data Not Normal at 5% Significance Level**											
1510												
1511	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1512					KM Mean	299.5			KM Standard Error of Mean	62.71		
1513					KM SD	1120			95% KM (BCA) UCL	420.2		
1514					95% KM (t) UCL	403			95% KM (Percentile Bootstrap) UCL	407.1		
1515					95% KM (z) UCL	402.7			95% KM Bootstrap t UCL	540		
1516					90% KM Chebyshev UCL	487.6			95% KM Chebyshev UCL	572.9		
1517					97.5% KM Chebyshev UCL	691.2			99% KM Chebyshev UCL	923.5		
1518												
1519	**Gamma GOF Tests on Detected Observations Only**											
1520					A-D Test Statistic	8.94			**Anderson-Darling GOF Test**			
1521					5% A-D Critical Value	0.845			Detected Data Not Gamma Distributed at 5% Significance Level			
1522					K-S Test Statistic	0.102			**Kolmogorov-Smirnov GOF**			
1523					5% K-S Critical Value	0.0554			Detected Data Not Gamma Distributed at 5% Significance Level			
1524	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1525												
1526	**Gamma Statistics on Detected Data Only**											
1527					k hat (MLE)	0.406			k star (bias corrected MLE)	0.404		
1528					Theta hat (MLE)	774.4			Theta star (bias corrected MLE)	777.9		
1529					nu hat (MLE)	247.4			nu star (bias corrected)	246.3		
1530					Mean (detects)	314.1						
1531												
1532	**Gamma ROS Statistics using Imputed Non-Detects**											
1533	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1534	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1535	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1536	This is especially true when the sample size is small.											
1537	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1538					Minimum	0.01			Mean	299.3		
1539					Maximum	18200			Median	65.25		
1540					SD	1122			CV	3.748		
1541					k hat (MLE)	0.341			k star (bias corrected MLE)	0.34		
1542					Theta hat (MLE)	877.9			Theta star (bias corrected MLE)	880.8		
1543					nu hat (MLE)	218.2			nu star (bias corrected)	217.5		
1544					Adjusted Level of Significance (β)	0.0493						
1545					Approximate Chi Square Value (217.51, α)	184.4			Adjusted Chi Square Value (217.51, β)	184.2		
1546					95% Gamma Approximate UCL (use when n>=50)	353.1			95% Gamma Adjusted UCL (use when n<50)	353.4		
1547												
1548	**Estimates of Gamma Parameters using KM Estimates**											
1549					Mean (KM)	299.5			SD (KM)	1120		
1550					Variance (KM)	1254475			SE of Mean (KM)	62.71		
1551					k hat (KM)	0.0715			k star (KM)	0.0729		
1552					nu hat (KM)	45.76			nu star (KM)	46.67		
1553					theta hat (KM)	4189			theta star (KM)	4107		
1554					80% gamma percentile (KM)	117.6			90% gamma percentile (KM)	666.6		
1555					95% gamma percentile (KM)	1730			99% gamma percentile (KM)	5539		
1556												
1557	**Gamma Kaplan-Meier (KM) Statistics**											
1558					Approximate Chi Square Value (46.67, α)	31.99			Adjusted Chi Square Value (46.67, β)	31.94		
1559					95% Gamma Approximate KM-UCL (use when n>=50)	436.9			95% Gamma Adjusted KM-UCL (use when n<50)	437.6		
1560												

	A	B	C	D	E	F	G	H	I	J	K	L
1561	**Lognormal GOF Test on Detected Observations Only**											
1562	Shapiro Wilk Approximate Test Statistic					0.952	**Shapiro Wilk GOF Test**					
1563	5% Shapiro Wilk P Value					4.633E-10	Detected Data Not Lognormal at 5% Significance Level					
1564	Lilliefors Test Statistic					0.0916	**Lilliefors GOF Test**					
1565	5% Lilliefors Critical Value					0.0511	Detected Data Not Lognormal at 5% Significance Level					
1566	**Detected Data Not Lognormal at 5% Significance Level**											
1567												
1568	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1569	Mean in Original Scale					299.4	Mean in Log Scale					3.972
1570	SD in Original Scale					1122	SD in Log Scale					1.973
1571	95% t UCL (assumes normality of ROS data)					402.9	95% Percentile Bootstrap UCL					408.6
1572	95% BCA Bootstrap UCL					462	95% Bootstrap t UCL					534.2
1573	95% H-UCL (Log ROS)					521.2						
1574												
1575	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1576	KM Mean (logged)					3.992	KM Geo Mean					54.18
1577	KM SD (logged)					1.937	95% Critical H Value (KM-Log)					3.026
1578	KM Standard Error of Mean (logged)					0.109	95% H-UCL (KM -Log)					491.3
1579	KM SD (logged)					1.937	95% Critical H Value (KM-Log)					3.026
1580	KM Standard Error of Mean (logged)					0.109						
1581												
1582	**DL/2 Statistics**											
1583	**DL/2 Normal**						**DL/2 Log-Transformed**					
1584	Mean in Original Scale					299.4	Mean in Log Scale					3.977
1585	SD in Original Scale					1122	SD in Log Scale					1.962
1586	95% t UCL (Assumes normality)					402.9	95% H-Stat UCL					511.4
1587	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1588												
1589	**Nonparametric Distribution Free UCL Statistics**											
1590	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1591												
1592	**Suggested UCL to Use**											
1593	95% KM (Chebyshev) UCL					572.9						
1594												
1595	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1596	Recommendations are based upon data size, data distribution, and skewness.											
1597	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1598	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1599												
1600	**Val_SELENIUM**											
1601												
1602	**General Statistics**											
1603	Total Number of Observations					320	Number of Distinct Observations					96
1604	Number of Detects					125	Number of Non-Detects					195
1605	Number of Distinct Detects					85	Number of Distinct Non-Detects					34
1606	Minimum Detect					0.3	Minimum Non-Detect					2.6
1607	Maximum Detect					68.2	Maximum Non-Detect					418
1608	Variance Detects					55.85	Percent Non-Detects					60.94%
1609	Mean Detects					5.49	SD Detects					7.473
1610	Median Detects					3.8	CV Detects					1.361
1611	Skewness Detects					5.437	Kurtosis Detects					40.83
1612	Mean of Logged Detects					1.203	SD of Logged Detects					1.016

	A	B	C	D	E	F	G	H	I	J	K	L
1613												
1614	**Normal GOF Test on Detects Only**											
1615					Shapiro Wilk Test Statistic	0.573	**Normal GOF Test on Detected Observations Only**					
1616					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
1617					Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**					
1618					5% Lilliefors Critical Value	0.0796	Detected Data Not Normal at 5% Significance Level					
1619	**Detected Data Not Normal at 5% Significance Level**											
1620												
1621	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1622					KM Mean	3.098	KM Standard Error of Mean	0.295				
1623					KM SD	5.088	95% KM (BCA) UCL	3.57				
1624					95% KM (t) UCL	3.585	95% KM (Percentile Bootstrap) UCL	3.618				
1625					95% KM (z) UCL	3.584	95% KM Bootstrap t UCL	3.782				
1626					90% KM Chebyshev UCL	3.983	95% KM Chebyshev UCL	4.384				
1627					97.5% KM Chebyshev UCL	4.94	99% KM Chebyshev UCL	6.033				
1628												
1629	**Gamma GOF Tests on Detected Observations Only**											
1630					A-D Test Statistic	1.02	**Anderson-Darling GOF Test**					
1631					5% A-D Critical Value	0.78	Detected Data Not Gamma Distributed at 5% Significance Level					
1632					K-S Test Statistic	0.0816	**Kolmogorov-Smirnov GOF**					
1633					5% K-S Critical Value	0.0852	Detected data appear Gamma Distributed at 5% Significance Level					
1634	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
1635												
1636	**Gamma Statistics on Detected Data Only**											
1637					k hat (MLE)	1.137	k star (bias corrected MLE)	1.115				
1638					Theta hat (MLE)	4.827	Theta star (bias corrected MLE)	4.922				
1639					nu hat (MLE)	284.3	nu star (bias corrected)	278.8				
1640					Mean (detects)	5.49						
1641												
1642	**Gamma ROS Statistics using Imputed Non-Detects**											
1643	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1644	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1645	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1646	This is especially true when the sample size is small.											
1647	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1648					Minimum	0.01	Mean	2.59				
1649					Maximum	68.2	Median	1.028				
1650					SD	5.28	CV	2.039				
1651					k hat (MLE)	0.334	k star (bias corrected MLE)	0.333				
1652					Theta hat (MLE)	7.742	Theta star (bias corrected MLE)	7.767				
1653					nu hat (MLE)	214.1	nu star (bias corrected)	213.4				
1654					Adjusted Level of Significance (β)	0.0493						
1655					Approximate Chi Square Value (213.40, α)	180.6	Adjusted Chi Square Value (213.40, β)	180.5				
1656					95% Gamma Approximate UCL (use when n>=50)	3.06	95% Gamma Adjusted UCL (use when n<50)	3.062				
1657												
1658	**Estimates of Gamma Parameters using KM Estimates**											
1659					Mean (KM)	3.098	SD (KM)	5.088				
1660					Variance (KM)	25.89	SE of Mean (KM)	0.295				
1661					k hat (KM)	0.371	k star (KM)	0.369				
1662					nu hat (KM)	237.3	nu star (KM)	236.4				
1663					theta hat (KM)	8.355	theta star (KM)	8.386				
1664					80% gamma percentile (KM)	4.948	90% gamma percentile (KM)	8.871				

1665	95% gamma percentile (KM)					13.23	99% gamma percentile (KM)					24.28
1666												
1667	**Gamma Kaplan-Meier (KM) Statistics**											
1668	Approximate Chi Square Value (236.45, α)					201.9	Adjusted Chi Square Value (236.45, β)					201.7
1669	95% Gamma Approximate KM-UCL (use when n>=50)					3.629	95% Gamma Adjusted KM-UCL (use when n<50)					3.632
1670												
1671	**Lognormal GOF Test on Detected Observations Only**											
1672	Shapiro Wilk Approximate Test Statistic					0.981	**Shapiro Wilk GOF Test**					
1673	5% Shapiro Wilk P Value					0.505	Detected Data appear Lognormal at 5% Significance Level					
1674	Lilliefors Test Statistic					0.0677	**Lilliefors GOF Test**					
1675	5% Lilliefors Critical Value					0.0796	Detected Data appear Lognormal at 5% Significance Level					
1676	**Detected Data appear Lognormal at 5% Significance Level**											
1677												
1678	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1679	Mean in Original Scale					3.085	Mean in Log Scale					0.641
1680	SD in Original Scale					5.081	SD in Log Scale					0.901
1681	95% t UCL (assumes normality of ROS data)					3.554	95% Percentile Bootstrap UCL					3.584
1682	95% BCA Bootstrap UCL					3.724	95% Bootstrap t UCL					3.776
1683	95% H-UCL (Log ROS)					3.158						
1684												
1685	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1686	KM Mean (logged)					0.631	KM Geo Mean					1.879
1687	KM SD (logged)					0.925	95% Critical H Value (KM-Log)					2.061
1688	KM Standard Error of Mean (logged)					0.0764	95% H-UCL (KM -Log)					3.205
1689	KM SD (logged)					0.925	95% Critical H Value (KM-Log)					2.061
1690	KM Standard Error of Mean (logged)					0.0764						
1691												
1692	**DL/2 Statistics**											
1693	**DL/2 Normal**						**DL/2 Log-Transformed**					
1694	Mean in Original Scale					3.927	Mean in Log Scale					0.843
1695	SD in Original Scale					12.55	SD in Log Scale					0.766
1696	95% t UCL (Assumes normality)					5.084	95% H-Stat UCL					3.387
1697	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1698												
1699	**Nonparametric Distribution Free UCL Statistics**											
1700	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**											
1701												
1702	**Suggested UCL to Use**											
1703	95% KM Approximate Gamma UCL					3.629	95% GROS Approximate Gamma UCL					3.06
1704												
1705	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
1706	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
1707												
1708	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1709	Recommendations are based upon data size, data distribution, and skewness.											
1710	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1711	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1712												
1713	**Val_SILVER**											
1714												
1715	**General Statistics**											
1716	Total Number of Observations					320	Number of Distinct Observations					148

1717					Number of Detects	225					Number of Non-Detects	95
1718					Number of Distinct Detects	147					Number of Distinct Non-Detects	8
1719					Minimum Detect	0.052					Minimum Non-Detect	0.84
1720					Maximum Detect	136					Maximum Non-Detect	119
1721					Variance Detects	162.3					Percent Non-Detects	29.69%
1722					Mean Detects	5.37					SD Detects	12.74
1723					Median Detects	1.6					CV Detects	2.372
1724					Skewness Detects	7.625					Kurtosis Detects	69.76
1725					Mean of Logged Detects	0.627					SD of Logged Detects	1.473
1726												
1727					**Normal GOF Test on Detects Only**							
1728					Shapiro Wilk Test Statistic	0.387					**Normal GOF Test on Detected Observations Only**	
1729					5% Shapiro Wilk P Value	0					Detected Data Not Normal at 5% Significance Level	
1730					Lilliefors Test Statistic	0.338					**Lilliefors GOF Test**	
1731					5% Lilliefors Critical Value	0.0595					Detected Data Not Normal at 5% Significance Level	
1732					**Detected Data Not Normal at 5% Significance Level**							
1733												
1734					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1735					KM Mean	3.936					KM Standard Error of Mean	0.611
1736					KM SD	10.9					95% KM (BCA) UCL	5.045
1737					95% KM (t) UCL	4.944					95% KM (Percentile Bootstrap) UCL	5.005
1738					95% KM (z) UCL	4.942					95% KM Bootstrap t UCL	5.699
1739					90% KM Chebyshev UCL	5.77					95% KM Chebyshev UCL	6.6
1740					97.5% KM Chebyshev UCL	7.753					99% KM Chebyshev UCL	10.02
1741												
1742					**Gamma GOF Tests on Detected Observations Only**							
1743					A-D Test Statistic	4.899					**Anderson-Darling GOF Test**	
1744					5% A-D Critical Value	0.812					Detected Data Not Gamma Distributed at 5% Significance Level	
1745					K-S Test Statistic	0.125					**Kolmogorov-Smirnov GOF**	
1746					5% K-S Critical Value	0.0639					Detected Data Not Gamma Distributed at 5% Significance Level	
1747					**Detected Data Not Gamma Distributed at 5% Significance Level**							
1748												
1749					**Gamma Statistics on Detected Data Only**							
1750					k hat (MLE)	0.588					k star (bias corrected MLE)	0.583
1751					Theta hat (MLE)	9.131					Theta star (bias corrected MLE)	9.207
1752					nu hat (MLE)	264.7					nu star (bias corrected)	262.5
1753					Mean (detects)	5.37						
1754												
1755					**Gamma ROS Statistics using Imputed Non-Detects**							
1756					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1757					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1758					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1759					This is especially true when the sample size is small.							
1760					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1761					Minimum	0.01					Mean	3.781
1762					Maximum	136					Median	0.735
1763					SD	10.95					CV	2.897
1764					k hat (MLE)	0.308					k star (bias corrected MLE)	0.307
1765					Theta hat (MLE)	12.27					Theta star (bias corrected MLE)	12.3
1766					nu hat (MLE)	197.2					nu star (bias corrected)	196.7
1767					Adjusted Level of Significance (β)	0.0493						
1768					Approximate Chi Square Value (196.72, α)	165.3					Adjusted Chi Square Value (196.72, β)	165.1

	A	B	C	D	E	F	G	H	I	J	K	L
1769	95% Gamma Approximate UCL (use when n>=50)					4.501	95% Gamma Adjusted UCL (use when n<50)					4.504
1770												
1771	**Estimates of Gamma Parameters using KM Estimates**											
1772	Mean (KM)					3.936	SD (KM)					10.9
1773	Variance (KM)					118.7	SE of Mean (KM)					0.611
1774	k hat (KM)					0.131	k star (KM)					0.131
1775	nu hat (KM)					83.52	nu star (KM)					84.07
1776	theta hat (KM)					30.16	theta star (KM)					29.97
1777	80% gamma percentile (KM)					3.8	90% gamma percentile (KM)					11.4
1778	95% gamma percentile (KM)					22.18	99% gamma percentile (KM)					54.35
1779												
1780	**Gamma Kaplan-Meier (KM) Statistics**											
1781	Approximate Chi Square Value (84.07, α)					63.94	Adjusted Chi Square Value (84.07, β)					63.86
1782	95% Gamma Approximate KM-UCL (use when n>=50)					5.176	95% Gamma Adjusted KM-UCL (use when n<50)					5.182
1783												
1784	**Lognormal GOF Test on Detected Observations Only**											
1785	Shapiro Wilk Approximate Test Statistic					0.978	**Shapiro Wilk GOF Test**					
1786	5% Shapiro Wilk P Value					0.173	Detected Data appear Lognormal at 5% Significance Level					
1787	Lilliefors Test Statistic					0.0494	**Lilliefors GOF Test**					
1788	5% Lilliefors Critical Value					0.0595	Detected Data appear Lognormal at 5% Significance Level					
1789	**Detected Data appear Lognormal at 5% Significance Level**											
1790												
1791	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1792	Mean in Original Scale					3.95	Mean in Log Scale					0.197
1793	SD in Original Scale					10.9	SD in Log Scale					1.474
1794	95% t UCL (assumes normality of ROS data)					4.955	95% Percentile Bootstrap UCL					4.999
1795	95% BCA Bootstrap UCL					5.237	95% Bootstrap t UCL					5.925
1796	95% H-UCL (Log ROS)					4.452						
1797												
1798	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1799	KM Mean (logged)					0.183	KM Geo Mean					1.201
1800	KM SD (logged)					1.465	95% Critical H Value (KM-Log)					2.536
1801	KM Standard Error of Mean (logged)					0.0879	95% H-UCL (KM -Log)					4.326
1802	KM SD (logged)					1.465	95% Critical H Value (KM-Log)					2.536
1803	KM Standard Error of Mean (logged)					0.0879						
1804												
1805	**DL/2 Statistics**											
1806	**DL/2 Normal**						**DL/2 Log-Transformed**					
1807	Mean in Original Scale					4.14	Mean in Log Scale					0.306
1808	SD in Original Scale					11.33	SD in Log Scale					1.355
1809	95% t UCL (Assumes normality)					5.185	95% H-Stat UCL					4.09
1810	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1811												
1812	**Nonparametric Distribution Free UCL Statistics**											
1813	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
1814												
1815	**Suggested UCL to Use**											
1816	KM H-UCL					4.326						
1817												
1818	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1819	Recommendations are based upon data size, data distribution, and skewness.											
1820	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											

1821	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1822												
1823	**Val_THALLIUM**											
1824												
1825	**General Statistics**											
1826						Total Number of Observations	315				Number of Distinct Observations	123
1827						Number of Detects	143				Number of Non-Detects	172
1828						Number of Distinct Detects	107				Number of Distinct Non-Detects	30
1829						Minimum Detect	0.18				Minimum Non-Detect	1.95
1830						Maximum Detect	84.5				Maximum Non-Detect	5.9
1831						Variance Detects	79.36				Percent Non-Detects	54.6%
1832						Mean Detects	6.414				SD Detects	8.909
1833						Median Detects	4.15				CV Detects	1.389
1834						Skewness Detects	5.125				Kurtosis Detects	41.04
1835						Mean of Logged Detects	1.118				SD of Logged Detects	1.353
1836												
1837	**Normal GOF Test on Detects Only**											
1838						Shapiro Wilk Test Statistic	0.628				**Normal GOF Test on Detected Observations Only**	
1839						5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level	
1840						Lilliefors Test Statistic	0.242				**Lilliefors GOF Test**	
1841						5% Lilliefors Critical Value	0.0745				Detected Data Not Normal at 5% Significance Level	
1842	**Detected Data Not Normal at 5% Significance Level**											
1843												
1844	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1845						KM Mean	3.46				KM Standard Error of Mean	0.376
1846						KM SD	6.582				95% KM (BCA) UCL	4.114
1847						95% KM (t) UCL	4.081				95% KM (Percentile Bootstrap) UCL	4.109
1848						95% KM (z) UCL	4.079				95% KM Bootstrap t UCL	4.285
1849						90% KM Chebyshev UCL	4.588				95% KM Chebyshev UCL	5.099
1850						97.5% KM Chebyshev UCL	5.809				99% KM Chebyshev UCL	7.202
1851												
1852	**Gamma GOF Tests on Detected Observations Only**											
1853						A-D Test Statistic	0.808				**Anderson-Darling GOF Test**	
1854						5% A-D Critical Value	0.793				Detected Data Not Gamma Distributed at 5% Significance Level	
1855						K-S Test Statistic	0.0601				**Kolmogorov-Smirnov GOF**	
1856						5% K-S Critical Value	0.0813				Detected data appear Gamma Distributed at 5% Significance Level	
1857	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
1858												
1859	**Gamma Statistics on Detected Data Only**											
1860						k hat (MLE)	0.801				k star (bias corrected MLE)	0.789
1861						Theta hat (MLE)	8.004				Theta star (bias corrected MLE)	8.127
1862						nu hat (MLE)	229.2				nu star (bias corrected)	225.7
1863						Mean (detects)	6.414					
1864												
1865	**Gamma ROS Statistics using Imputed Non-Detects**											
1866	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1867	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1868	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1869	This is especially true when the sample size is small.											
1870	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1871						Minimum	0.01				Mean	3.205
1872						Maximum	84.5				Median	0.717

1873					SD	6.71				CV		2.094
1874					k hat (MLE)	0.295				k star (bias corrected MLE)		0.294
1875					Theta hat (MLE)	10.88				Theta star (bias corrected MLE)		10.91
1876					nu hat (MLE)	185.6				nu star (bias corrected)		185.1
1877					Adjusted Level of Significance (β)	0.0492						
1878					Approximate Chi Square Value (185.15, α)	154.7				Adjusted Chi Square Value (185.15, β)		154.5
1879					95% Gamma Approximate UCL (use when n>=50)	3.837				95% Gamma Adjusted UCL (use when n<50)		3.84
1880												
1881					**Estimates of Gamma Parameters using KM Estimates**							
1882					Mean (KM)	3.46				SD (KM)		6.582
1883					Variance (KM)	43.32				SE of Mean (KM)		0.376
1884					k hat (KM)	0.276				k star (KM)		0.276
1885					nu hat (KM)	174.1				nu star (KM)		173.8
1886					theta hat (KM)	12.52				theta star (KM)		12.54
1887					80% gamma percentile (KM)	5.188				90% gamma percentile (KM)		10.3
1888					95% gamma percentile (KM)	16.25				99% gamma percentile (KM)		31.89
1889												
1890					**Gamma Kaplan-Meier (KM) Statistics**							
1891					Approximate Chi Square Value (173.79, α)	144.3				Adjusted Chi Square Value (173.79, β)		144.2
1892					95% Gamma Approximate KM-UCL (use when n>=50)	4.167				95% Gamma Adjusted KM-UCL (use when n<50)		4.171
1893												
1894					**Lognormal GOF Test on Detected Observations Only**							
1895					Shapiro Wilk Approximate Test Statistic	0.95				**Shapiro Wilk GOF Test**		
1896					5% Shapiro Wilk P Value	1.1563E-4				Detected Data Not Lognormal at 5% Significance Level		
1897					Lilliefors Test Statistic	0.103				**Lilliefors GOF Test**		
1898					5% Lilliefors Critical Value	0.0745				Detected Data Not Lognormal at 5% Significance Level		
1899					**Detected Data Not Lognormal at 5% Significance Level**							
1900												
1901					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1902					Mean in Original Scale	3.499				Mean in Log Scale		0.404
1903					SD in Original Scale	6.578				SD in Log Scale		1.259
1904					95% t UCL (assumes normality of ROS data)	4.111				95% Percentile Bootstrap UCL		4.151
1905					95% BCA Bootstrap UCL	4.267				95% Bootstrap t UCL		4.318
1906					95% H-UCL (Log ROS)	3.908						
1907												
1908					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1909					KM Mean (logged)	0.351				KM Geo Mean		1.421
1910					KM SD (logged)	1.289				95% Critical H Value (KM-Log)		2.368
1911					KM Standard Error of Mean (logged)	0.0967				95% H-UCL (KM -Log)		3.876
1912					KM SD (logged)	1.289				95% Critical H Value (KM-Log)		2.368
1913					KM Standard Error of Mean (logged)	0.0967						
1914												
1915					**DL/2 Statistics**							
1916					**DL/2 Normal**					**DL/2 Log-Transformed**		
1917					Mean in Original Scale	3.709				Mean in Log Scale		0.707
1918					SD in Original Scale	6.483				SD in Log Scale		0.992
1919					95% t UCL (Assumes normality)	4.312				95% H-Stat UCL		3.733
1920					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1921												
1922					**Nonparametric Distribution Free UCL Statistics**							
1923					**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**							
1924												

	A	B	C	D	E	F	G	H	I	J	K	L
1925	**Suggested UCL to Use**											
1926	95% KM Approximate Gamma UCL					4.167						
1927												
1928	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
1929	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
1930												
1931	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1932	Recommendations are based upon data size, data distribution, and skewness.											
1933	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1934	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1935												
1936												
1937	**Val_VANADIUM_FUME_OR_DUST**											
1938												
1939	**General Statistics**											
1940	Total Number of Observations					320	Number of Distinct Observations					267
1941							Number of Missing Observations					0
1942	Minimum					4.7	Mean					64.48
1943	Maximum					1820	Median					29.5
1944	SD					141.5	Std. Error of Mean					7.912
1945	Coefficient of Variation					2.195	Skewness					8.125
1946												
1947	**Normal GOF Test**											
1948	Shapiro Wilk Test Statistic					0.353	**Shapiro Wilk GOF Test**					
1949	5% Shapiro Wilk P Value					0	Data Not Normal at 5% Significance Level					
1950	Lilliefors Test Statistic					0.336	**Lilliefors GOF Test**					
1951	5% Lilliefors Critical Value					0.0499	Data Not Normal at 5% Significance Level					
1952	**Data Not Normal at 5% Significance Level**											
1953												
1954	**Assuming Normal Distribution**											
1955	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1956	95% Student's-t UCL					77.53	95% Adjusted-CLT UCL (Chen-1995)					81.33
1957							95% Modified-t UCL (Johnson-1978)					78.13
1958												
1959	**Gamma GOF Test**											
1960	A-D Test Statistic					19.01	**Anderson-Darling Gamma GOF Test**					
1961	5% A-D Critical Value					0.784	Data Not Gamma Distributed at 5% Significance Level					
1962	K-S Test Statistic					0.178	**Kolmogorov-Smirnov Gamma GOF Test**					
1963	5% K-S Critical Value					0.0523	Data Not Gamma Distributed at 5% Significance Level					
1964	**Data Not Gamma Distributed at 5% Significance Level**											
1965												
1966	**Gamma Statistics**											
1967	k hat (MLE)					0.993	k star (bias corrected MLE)					0.986
1968	Theta hat (MLE)					64.93	Theta star (bias corrected MLE)					65.4
1969	nu hat (MLE)					635.5	nu star (bias corrected)					630.9
1970	MLE Mean (bias corrected)					64.48	MLE Sd (bias corrected)					64.94
1971							Approximate Chi Square Value (0.05)					573.6
1972	Adjusted Level of Significance					0.0493	Adjusted Chi Square Value					573.4
1973												
1974	**Assuming Gamma Distribution**											
1975	95% Approximate Gamma UCL (use when n>=50))					70.91	95% Adjusted Gamma UCL (use when n<50)					70.94
1976												

	A	B	C	D	E	F	G	H	I	J	K	L
1977	**Lognormal GOF Test**											
1978					Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk Lognormal GOF Test**					
1979					5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level					
1980					Lilliefors Test Statistic	0.0929	**Lilliefors Lognormal GOF Test**					
1981					5% Lilliefors Critical Value	0.0499	Data Not Lognormal at 5% Significance Level					
1982	**Data Not Lognormal at 5% Significance Level**											
1983												
1984	**Lognormal Statistics**											
1985					Minimum of Logged Data	1.548			Mean of logged Data			3.585
1986					Maximum of Logged Data	7.507			SD of logged Data			0.898
1987												
1988	**Assuming Lognormal Distribution**											
1989					95% H-UCL	59.75			90% Chebyshev (MVUE) UCL			63.38
1990					95% Chebyshev (MVUE) UCL	67.7			97.5% Chebyshev (MVUE) UCL			73.71
1991					99% Chebyshev (MVUE) UCL	85.5						
1992												
1993	**Nonparametric Distribution Free UCL Statistics**											
1994	**Data do not follow a Discernible Distribution (0.05)**											
1995												
1996	**Nonparametric Distribution Free UCLs**											
1997					95% CLT UCL	77.49			95% Jackknife UCL			77.53
1998					95% Standard Bootstrap UCL	77.73			95% Bootstrap-t UCL			85.61
1999					95% Hall's Bootstrap UCL	89.2			95% Percentile Bootstrap UCL			78.56
2000					95% BCA Bootstrap UCL	81.34						
2001					90% Chebyshev(Mean, Sd) UCL	88.21			95% Chebyshev(Mean, Sd) UCL			98.96
2002					97.5% Chebyshev(Mean, Sd) UCL	113.9			99% Chebyshev(Mean, Sd) UCL			143.2
2003												
2004	**Suggested UCL to Use**											
2005					95% Chebyshev (Mean, Sd) UCL	98.96						
2006												
2007	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2008	Recommendations are based upon data size, data distribution, and skewness.											
2009	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2010	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2011												
2012	**Val_ZINC**											
2013												
2014	**General Statistics**											
2015					Total Number of Observations	320			Number of Distinct Observations			294
2016					Number of Detects	318			Number of Non-Detects			2
2017					Number of Distinct Detects	292			Number of Distinct Non-Detects			2
2018					Minimum Detect	8.1			Minimum Non-Detect			5
2019					Maximum Detect	127000			Maximum Non-Detect			7.5
2020					Variance Detects	70309213			Percent Non-Detects			0.625%
2021					Mean Detects	3076			SD Detects			8385
2022					Median Detects	582			CV Detects			2.726
2023					Skewness Detects	10.72			Kurtosis Detects			151.7
2024					Mean of Logged Detects	6.184			SD of Logged Detects			2.264
2025												
2026	**Normal GOF Test on Detects Only**											
2027					Shapiro Wilk Test Statistic	0.371	**Normal GOF Test on Detected Observations Only**					
2028					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
2029					Lilliefors Test Statistic	0.357	**Lilliefors GOF Test**					
2030					5% Lilliefors Critical Value	0.0501	Detected Data Not Normal at 5% Significance Level					
2031	**Detected Data Not Normal at 5% Significance Level**											
2032												
2033	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2034					KM Mean	3057			KM Standard Error of Mean			467.5
2035					KM SD	8349			95% KM (BCA) UCL			3998
2036					95% KM (t) UCL	3828			95% KM (Percentile Bootstrap) UCL			3887
2037					95% KM (z) UCL	3826			95% KM Bootstrap t UCL			4432
2038					90% KM Chebyshev UCL	4459			95% KM Chebyshev UCL			5094
2039					97.5% KM Chebyshev UCL	5976			99% KM Chebyshev UCL			7708
2040												
2041	**Gamma GOF Tests on Detected Observations Only**											
2042					A-D Test Statistic	5.245	**Anderson-Darling GOF Test**					
2043					5% A-D Critical Value	0.856	Detected Data Not Gamma Distributed at 5% Significance Level					
2044					K-S Test Statistic	0.0906	**Kolmogorov-Smirnov GOF**					
2045					5% K-S Critical Value	0.0548	Detected Data Not Gamma Distributed at 5% Significance Level					
2046	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2047												
2048	**Gamma Statistics on Detected Data Only**											
2049					k hat (MLE)	0.362			k star (bias corrected MLE)			0.361
2050					Theta hat (MLE)	8498			Theta star (bias corrected MLE)			8529
2051					nu hat (MLE)	230.2			nu star (bias corrected)			229.4
2052					Mean (detects)	3076						
2053												
2054	**Gamma ROS Statistics using Imputed Non-Detects**											
2055	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2056	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2057	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2058	This is especially true when the sample size is small.											
2059	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2060					Minimum	0.01			Mean			3057
2061					Maximum	127000			Median			580.5
2062					SD	8362			CV			2.736
2063					k hat (MLE)	0.352			k star (bias corrected MLE)			0.351
2064					Theta hat (MLE)	8684			Theta star (bias corrected MLE)			8715
2065					nu hat (MLE)	225.3			nu star (bias corrected)			224.5
2066					Adjusted Level of Significance (β)	0.0493						
2067					Approximate Chi Square Value (224.48, α)	190.8			Adjusted Chi Square Value (224.48, β)			190.7
2068					95% Gamma Approximate UCL (use when n>=50)	3596			95% Gamma Adjusted UCL (use when n<50)			3599
2069												
2070	**Estimates of Gamma Parameters using KM Estimates**											
2071					Mean (KM)	3057			SD (KM)			8349
2072					Variance (KM)	69708632			SE of Mean (KM)			467.5
2073					k hat (KM)	0.134			k star (KM)			0.135
2074					nu hat (KM)	85.78			nu star (KM)			86.31
2075					theta hat (KM)	22806			theta star (KM)			22666
2076					80% gamma percentile (KM)	3027			90% gamma percentile (KM)			8903
2077					95% gamma percentile (KM)	17148			99% gamma percentile (KM)			41628
2078												
2079	**Gamma Kaplan-Meier (KM) Statistics**											
2080					Approximate Chi Square Value (86.31, α)	65.89			Adjusted Chi Square Value (86.31, β)			65.81

	A	B	C	D	E	F	G	H	I	J	K	L
2081	95% Gamma Approximate KM-UCL (use when n>=50)					4004	95% Gamma Adjusted KM-UCL (use when n<50)					4009
2082												
2083	**Lognormal GOF Test on Detected Observations Only**											
2084	Shapiro Wilk Approximate Test Statistic					0.937	**Shapiro Wilk GOF Test**					
2085	5% Shapiro Wilk P Value					0	Detected Data Not Lognormal at 5% Significance Level					
2086	Lilliefors Test Statistic					0.0808	**Lilliefors GOF Test**					
2087	5% Lilliefors Critical Value					0.0501	Detected Data Not Lognormal at 5% Significance Level					
2088	**Detected Data Not Lognormal at 5% Significance Level**											
2089												
2090	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2091	Mean in Original Scale					3057	Mean in Log Scale					6.144
2092	SD in Original Scale					8362	SD in Log Scale					2.312
2093	95% t UCL (assumes normality of ROS data)					3828	95% Percentile Bootstrap UCL					3899
2094	95% BCA Bootstrap UCL					4154	95% Bootstrap t UCL					4372
2095	95% H-UCL (Log ROS)					10525						
2096												
2097	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2098	KM Mean (logged)					6.155	KM Geo Mean					471.1
2099	KM SD (logged)					2.282	95% Critical H Value (KM-Log)					3.402
2100	KM Standard Error of Mean (logged)					0.128	95% H-UCL (KM -Log)					9844
2101	KM SD (logged)					2.282	95% Critical H Value (KM-Log)					3.402
2102	KM Standard Error of Mean (logged)					0.128						
2103												
2104	**DL/2 Statistics**											
2105	**DL/2 Normal**						**DL/2 Log-Transformed**					
2106	Mean in Original Scale					3057	Mean in Log Scale					6.152
2107	SD in Original Scale					8362	SD in Log Scale					2.293
2108	95% t UCL (Assumes normality)					3828	95% H-Stat UCL					10076
2109	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2110												
2111	**Nonparametric Distribution Free UCL Statistics**											
2112	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2113												
2114	**Suggested UCL to Use**											
2115	95% KM (Chebyshev) UCL					5094						
2116												
2117	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2118	Recommendations are based upon data size, data distribution, and skewness.											
2119	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2120	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2121												
2122	**Val_124_TRICHLOROBENZENE**											
2123												
2124	**General Statistics**											
2125	Total Number of Observations					233	Number of Distinct Observations					61
2126	Number of Detects					12	Number of Non-Detects					221
2127	Number of Distinct Detects					12	Number of Distinct Non-Detects					53
2128	Minimum Detect					0.0024	Minimum Non-Detect					0.0045
2129	Maximum Detect					36	Maximum Non-Detect					0.023
2130	Variance Detects					107.9	Percent Non-Detects					94.85%
2131	Mean Detects					3.022	SD Detects					10.39
2132	Median Detects					0.0117	CV Detects					3.437

2133					Skewness Detects	3.464					Kurtosis Detects	12
2134					Mean of Logged Detects	-3.788					SD of Logged Detects	2.625
2135												
2136	**Normal GOF Test on Detects Only**											
2137					Shapiro Wilk Test Statistic	0.329	**Shapiro Wilk GOF Test**					
2138					5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level					
2139					Lilliefors Test Statistic	0.528	**Lilliefors GOF Test**					
2140					5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level					
2141	**Detected Data Not Normal at 5% Significance Level**											
2142												
2143	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2144					KM Mean	0.159	KM Standard Error of Mean					0.161
2145					KM SD	2.353	95% KM (BCA) UCL					0.468
2146					95% KM (t) UCL	0.424	95% KM (Percentile Bootstrap) UCL					0.468
2147					95% KM (z) UCL	0.423	95% KM Bootstrap t UCL					73.49
2148					90% KM Chebyshev UCL	0.642	95% KM Chebyshev UCL					0.86
2149					97.5% KM Chebyshev UCL	1.164	99% KM Chebyshev UCL					1.761
2150												
2151	**Gamma GOF Tests on Detected Observations Only**											
2152					A-D Test Statistic	2.751	**Anderson-Darling GOF Test**					
2153					5% A-D Critical Value	0.91	Detected Data Not Gamma Distributed at 5% Significance Level					
2154					K-S Test Statistic	0.454	**Kolmogorov-Smirnov GOF**					
2155					5% K-S Critical Value	0.276	Detected Data Not Gamma Distributed at 5% Significance Level					
2156	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2157												
2158	**Gamma Statistics on Detected Data Only**											
2159					k hat (MLE)	0.156	k star (bias corrected MLE)					0.173
2160					Theta hat (MLE)	19.35	Theta star (bias corrected MLE)					17.5
2161					nu hat (MLE)	3.747	nu star (bias corrected)					4.144
2162					Mean (detects)	3.022						
2163												
2164	**Gamma ROS Statistics using Imputed Non-Detects**											
2165	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2166	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2167	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2168	This is especially true when the sample size is small.											
2169	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2170					Minimum	0.0024	Mean					0.165
2171					Maximum	36	Median					0.01
2172					SD	2.358	CV					14.28
2173					k hat (MLE)	0.256	k star (bias corrected MLE)					0.256
2174					Theta hat (MLE)	0.645	Theta star (bias corrected MLE)					0.646
2175					nu hat (MLE)	119.4	nu star (bias corrected)					119.2
2176					Adjusted Level of Significance (β)	0.049						
2177					Approximate Chi Square Value (119.17, α)	94.96	Adjusted Chi Square Value (119.17, β)					94.83
2178					95% Gamma Approximate UCL (use when n>=50)	0.207	95% Gamma Adjusted UCL (use when n<50)					0.207
2179												
2180	**Estimates of Gamma Parameters using KM Estimates**											
2181					Mean (KM)	0.159	SD (KM)					2.353
2182					Variance (KM)	5.537	SE of Mean (KM)					0.161
2183					k hat (KM)	0.00454	k star (KM)					0.00734
2184					nu hat (KM)	2.115	nu star (KM)					3.421

2185					theta hat (KM)	34.93					theta star (KM)	21.59
2186					80% gamma percentile (KM)	7.677E-13					90% gamma percentile (KM)	7.1315E-6
2187					95% gamma percentile (KM)	0.0113					99% gamma percentile (KM)	3.643
2188												
2189	**Gamma Kaplan-Meier (KM) Statistics**											
2190					Approximate Chi Square Value (3.42, α)	0.507					Adjusted Chi Square Value (3.42, β)	0.501
2191					95% Gamma Approximate KM-UCL (use when n>=50)	1.069					95% Gamma Adjusted KM-UCL (use when n<50)	1.082
2192												
2193	**Lognormal GOF Test on Detected Observations Only**											
2194					Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk GOF Test**					
2195					5% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 5% Significance Level					
2196					Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**					
2197					5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level					
2198	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
2199												
2200	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2201					Mean in Original Scale	0.159					Mean in Log Scale	-6.149
2202					SD in Original Scale	2.358					SD in Log Scale	1.278
2203					95% t UCL (assumes normality of ROS data)	0.414					95% Percentile Bootstrap UCL	0.467
2204					95% BCA Bootstrap UCL	0.776					95% Bootstrap t UCL	74.37
2205					95% H-UCL (Log ROS)	0.00591						
2206												
2207	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2208					KM Mean (logged)	-5.704					KM Geo Mean	0.00333
2209					KM SD (logged)	0.749					95% Critical H Value (KM-Log)	1.959
2210					KM Standard Error of Mean (logged)	0.099					95% H-UCL (KM -Log)	0.00486
2211					KM SD (logged)	0.749					95% Critical H Value (KM-Log)	1.959
2212					KM Standard Error of Mean (logged)	0.099						
2213												
2214	**DL/2 Statistics**											
2215					**DL/2 Normal**						**DL/2 Log-Transformed**	
2216					Mean in Original Scale	0.159					Mean in Log Scale	-5.672
2217					SD in Original Scale	2.358					SD in Log Scale	0.769
2218					95% t UCL (Assumes normality)	0.414					95% H-Stat UCL	0.00511
2219	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2220												
2221	**Nonparametric Distribution Free UCL Statistics**											
2222	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
2223												
2224	**Suggested UCL to Use**											
2225					KM H-UCL	0.00486						
2226												
2227	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2228	Recommendations are based upon data size, data distribution, and skewness.											
2229	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2230	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2231												
2232	**Val_14_DICHLOROBENZENE**											
2233												
2234	**General Statistics**											
2235					Total Number of Observations	233					Number of Distinct Observations	59
2236					Number of Detects	9					Number of Non-Detects	224

	A	B	C	D	E	F	G	H	I	J	K	L
2237					Number of Distinct Detects	8				Number of Distinct Non-Detects		53
2238					Minimum Detect	0.0037				Minimum Non-Detect		0.0045
2239					Maximum Detect	35				Maximum Non-Detect		0.023
2240					Variance Detects	132.4				Percent Non-Detects		96.14%
2241					Mean Detects	4.371				SD Detects		11.51
2242					Median Detects	0.052				CV Detects		2.633
2243					Skewness Detects	2.978				Kurtosis Detects		8.898
2244					Mean of Logged Detects	-2.13				SD of Logged Detects		3.333
2245												
2246					**Normal GOF Test on Detects Only**							
2247					Shapiro Wilk Test Statistic	0.439	**Shapiro Wilk GOF Test**					
2248					5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level					
2249					Lilliefors Test Statistic	0.481	**Lilliefors GOF Test**					
2250					5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level					
2251					**Detected Data Not Normal at 5% Significance Level**							
2252												
2253					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
2254					KM Mean	0.172				KM Standard Error of Mean		0.159
2255					KM SD	2.293				95% KM (BCA) UCL		0.498
2256					95% KM (t) UCL	0.436				95% KM (Percentile Bootstrap) UCL		0.473
2257					95% KM (z) UCL	0.434				95% KM Bootstrap t UCL		3.448
2258					90% KM Chebyshev UCL	0.65				95% KM Chebyshev UCL		0.867
2259					97.5% KM Chebyshev UCL	1.167				99% KM Chebyshev UCL		1.757
2260												
2261					**Gamma GOF Tests on Detected Observations Only**							
2262					A-D Test Statistic	0.782	**Anderson-Darling GOF Test**					
2263					5% A-D Critical Value	0.846	Detected data appear Gamma Distributed at 5% Significance Level					
2264					K-S Test Statistic	0.247	**Kolmogorov-Smirnov GOF**					
2265					5% K-S Critical Value	0.308	Detected data appear Gamma Distributed at 5% Significance Level					
2266					**Detected data appear Gamma Distributed at 5% Significance Level**							
2267												
2268					**Gamma Statistics on Detected Data Only**							
2269					k hat (MLE)	0.204				k star (bias corrected MLE)		0.21
2270					Theta hat (MLE)	21.47				Theta star (bias corrected MLE)		20.83
2271					nu hat (MLE)	3.664				nu star (bias corrected)		3.776
2272					Mean (detects)	4.371						
2273												
2274					**Gamma ROS Statistics using Imputed Non-Detects**							
2275					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
2276					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
2277					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
2278					This is especially true when the sample size is small.							
2279					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
2280					Minimum	0.0037				Mean		0.178
2281					Maximum	35				Median		0.01
2282					SD	2.297				CV		12.87
2283					k hat (MLE)	0.254				k star (bias corrected MLE)		0.254
2284					Theta hat (MLE)	0.702				Theta star (bias corrected MLE)		0.703
2285					nu hat (MLE)	118.5				nu star (bias corrected)		118.3
2286					Adjusted Level of Significance (β)	0.049						
2287					Approximate Chi Square Value (118.29, α)	94.18				Adjusted Chi Square Value (118.29, β)		94.04
2288					95% Gamma Approximate UCL (use when n>=50)	0.224				95% Gamma Adjusted UCL (use when n<50)		0.224

2289												
2290	**Estimates of Gamma Parameters using KM Estimates**											
2291					Mean (KM)	0.172				SD (KM)		2.293
2292					Variance (KM)	5.256				SE of Mean (KM)		0.159
2293					k hat (KM)	0.00566				k star (KM)		0.00845
2294					nu hat (KM)	2.637				nu star (KM)		3.937
2295					theta hat (KM)	30.47				theta star (KM)		20.42
2296					80% gamma percentile (KM)	3.896E-11				90% gamma percentile (KM)		4.4233E-5
2297					95% gamma percentile (KM)	0.0267				99% gamma percentile (KM)		4.28
2298												
2299	**Gamma Kaplan-Meier (KM) Statistics**											
2300					Approximate Chi Square Value (3.94, α)	0.697				Adjusted Chi Square Value (3.94, β)		0.689
2301					95% Gamma Approximate KM-UCL (use when n>=50)	0.974				95% Gamma Adjusted KM-UCL (use when n<50)		0.986
2302												
2303	**Lognormal GOF Test on Detected Observations Only**											
2304					Shapiro Wilk Test Statistic	0.883				**Shapiro Wilk GOF Test**		
2305					5% Shapiro Wilk Critical Value	0.829				Detected Data appear Lognormal at 5% Significance Level		
2306					Lilliefors Test Statistic	0.199				**Lilliefors GOF Test**		
2307					5% Lilliefors Critical Value	0.274				Detected Data appear Lognormal at 5% Significance Level		
2308	**Detected Data appear Lognormal at 5% Significance Level**											
2309												
2310	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2311					Mean in Original Scale	0.171				Mean in Log Scale		-7.477
2312					SD in Original Scale	2.298				SD in Log Scale		2.251
2313					95% t UCL (assumes normality of ROS data)	0.419				95% Percentile Bootstrap UCL		0.471
2314					95% BCA Bootstrap UCL	0.643				95% Bootstrap t UCL		3.503
2315					95% H-UCL (Log ROS)	0.0119						
2316												
2317	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2318					KM Mean (logged)	-5.447				KM Geo Mean		0.00431
2319					KM SD (logged)	0.91				95% Critical H Value (KM-Log)		2.078
2320					KM Standard Error of Mean (logged)	0.065				95% H-UCL (KM -Log)		0.00738
2321					KM SD (logged)	0.91				95% Critical H Value (KM-Log)		2.078
2322					KM Standard Error of Mean (logged)	0.065						
2323												
2324	**DL/2 Statistics**											
2325					**DL/2 Normal**					**DL/2 Log-Transformed**		
2326					Mean in Original Scale	0.172				Mean in Log Scale		-5.635
2327					SD in Original Scale	2.298				SD in Log Scale		0.975
2328					95% t UCL (Assumes normality)	0.421				95% H-Stat UCL		0.00658
2329	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2330												
2331	**Nonparametric Distribution Free UCL Statistics**											
2332	**Detected Data appear Gamma Distributed at 5% Significance Level**											
2333												
2334	**Suggested UCL to Use**											
2335					95% KM Approximate Gamma UCL	0.974						
2336												
2337	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2338	Recommendations are based upon data size, data distribution, and skewness.											
2339	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2340	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
2341												
2342	**Val_BENZOAANTHRACENE**											
2343												
2344	**General Statistics**											
2345					Total Number of Observations	309			Number of Distinct Observations	111		
2346					Number of Detects	201			Number of Non-Detects	108		
2347					Number of Distinct Detects	109			Number of Distinct Non-Detects	16		
2348					Minimum Detect	0.031			Minimum Non-Detect	0.18		
2349					Maximum Detect	15.35			Maximum Non-Detect	0.37		
2350					Variance Detects	3.118			Percent Non-Detects	34.95%		
2351					Mean Detects	0.822			SD Detects	1.766		
2352					Median Detects	0.31			CV Detects	2.148		
2353					Skewness Detects	4.764			Kurtosis Detects	28.09		
2354					Mean of Logged Detects	-1.098			SD of Logged Detects	1.192		
2355												
2356	**Normal GOF Test on Detects Only**											
2357					Shapiro Wilk Test Statistic	0.449		**Normal GOF Test on Detected Observations Only**				
2358					5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level				
2359					Lilliefors Test Statistic	0.327		**Lilliefors GOF Test**				
2360					5% Lilliefors Critical Value	0.0629		Detected Data Not Normal at 5% Significance Level				
2361	**Detected Data Not Normal at 5% Significance Level**											
2362												
2363	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2364					KM Mean	0.576			KM Standard Error of Mean	0.0833		
2365					KM SD	1.46			95% KM (BCA) UCL	0.732		
2366					95% KM (t) UCL	0.713			95% KM (Percentile Bootstrap) UCL	0.723		
2367					95% KM (z) UCL	0.713			95% KM Bootstrap t UCL	0.765		
2368					90% KM Chebyshev UCL	0.825			95% KM Chebyshev UCL	0.939		
2369					97.5% KM Chebyshev UCL	1.096			99% KM Chebyshev UCL	1.404		
2370												
2371	**Gamma GOF Tests on Detected Observations Only**											
2372					A-D Test Statistic	12.73		**Anderson-Darling GOF Test**				
2373					5% A-D Critical Value	0.804		Detected Data Not Gamma Distributed at 5% Significance Level				
2374					K-S Test Statistic	0.202		**Kolmogorov-Smirnov GOF**				
2375					5% K-S Critical Value	0.0664		Detected Data Not Gamma Distributed at 5% Significance Level				
2376	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2377												
2378	**Gamma Statistics on Detected Data Only**											
2379					k hat (MLE)	0.673			k star (bias corrected MLE)	0.667		
2380					Theta hat (MLE)	1.221			Theta star (bias corrected MLE)	1.233		
2381					nu hat (MLE)	270.7			nu star (bias corrected)	268		
2382					Mean (detects)	0.822						
2383												
2384	**Gamma ROS Statistics using Imputed Non-Detects**											
2385	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2386	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2387	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2388	This is especially true when the sample size is small.											
2389	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2390					Minimum	0.01			Mean	0.538		
2391					Maximum	15.35			Median	0.15		
2392					SD	1.475			CV	2.739		

2393					k hat (MLE)	0.39				k star (bias corrected MLE)		0.388
2394					Theta hat (MLE)	1.382				Theta star (bias corrected MLE)		1.388
2395					nu hat (MLE)	240.7				nu star (bias corrected)		239.7
2396					Adjusted Level of Significance (β)	0.0492						
2397					Approximate Chi Square Value (239.73, α)	204.9				Adjusted Chi Square Value (239.73, β)		204.7
2398					95% Gamma Approximate UCL (use when n>=50)	0.63				95% Gamma Adjusted UCL (use when n<50)		0.63
2399												
2400	**Estimates of Gamma Parameters using KM Estimates**											
2401					Mean (KM)	0.576				SD (KM)		1.46
2402					Variance (KM)	2.132				SE of Mean (KM)		0.0833
2403					k hat (KM)	0.155				k star (KM)		0.156
2404					nu hat (KM)	96.03				nu star (KM)		96.43
2405					theta hat (KM)	3.704				theta star (KM)		3.689
2406					80% gamma percentile (KM)	0.647				90% gamma percentile (KM)		1.715
2407					95% gamma percentile (KM)	3.143				99% gamma percentile (KM)		7.253
2408												
2409	**Gamma Kaplan-Meier (KM) Statistics**											
2410					Approximate Chi Square Value (96.43, α)	74.78				Adjusted Chi Square Value (96.43, β)		74.69
2411					95% Gamma Approximate KM-UCL (use when n>=50)	0.742				95% Gamma Adjusted KM-UCL (use when n<50)		0.743
2412												
2413	**Lognormal GOF Test on Detected Observations Only**											
2414					Shapiro Wilk Approximate Test Statistic	0.949				**Shapiro Wilk GOF Test**		
2415					5% Shapiro Wilk P Value	6.4125E-7				Detected Data Not Lognormal at 5% Significance Level		
2416					Lilliefors Test Statistic	0.097				**Lilliefors GOF Test**		
2417					5% Lilliefors Critical Value	0.0629				Detected Data Not Lognormal at 5% Significance Level		
2418	**Detected Data Not Lognormal at 5% Significance Level**											
2419												
2420	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2421					Mean in Original Scale	0.576				Mean in Log Scale		-1.524
2422					SD in Original Scale	1.463				SD in Log Scale		1.186
2423					95% t UCL (assumes normality of ROS data)	0.713				95% Percentile Bootstrap UCL		0.711
2424					95% BCA Bootstrap UCL	0.749				95% Bootstrap t UCL		0.757
2425					95% H-UCL (Log ROS)	0.513						
2426												
2427	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2428					KM Mean (logged)	-1.503				KM Geo Mean		0.223
2429					KM SD (logged)	1.143				95% Critical H Value (KM-Log)		2.236
2430					KM Standard Error of Mean (logged)	0.0698				95% H-UCL (KM -Log)		0.495
2431					KM SD (logged)	1.143				95% Critical H Value (KM-Log)		2.236
2432					KM Standard Error of Mean (logged)	0.0698						
2433												
2434	**DL/2 Statistics**											
2435	**DL/2 Normal**									**DL/2 Log-Transformed**		
2436					Mean in Original Scale	0.572				Mean in Log Scale		-1.496
2437					SD in Original Scale	1.463				SD in Log Scale		1.106
2438					95% t UCL (Assumes normality)	0.71				95% H-Stat UCL		0.475
2439	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2440												
2441	**Nonparametric Distribution Free UCL Statistics**											
2442	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2443												
2444	**Suggested UCL to Use**											

2445					95% KM (Chebyshev) UCL	0.939						
2446												
2447	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2448	Recommendations are based upon data size, data distribution, and skewness.											
2449	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2450	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2451												
2452	**Val_BENZOAPYRENE**											
2453												
2454	**General Statistics**											
2455					Total Number of Observations	309			Number of Distinct Observations	115		
2456					Number of Detects	196			Number of Non-Detects	113		
2457					Number of Distinct Detects	114			Number of Distinct Non-Detects	18		
2458					Minimum Detect	0.041			Minimum Non-Detect	0.18		
2459					Maximum Detect	12			Maximum Non-Detect	0.49		
2460					Variance Detects	2.409			Percent Non-Detects	36.57%		
2461					Mean Detects	0.769			SD Detects	1.552		
2462					Median Detects	0.3			CV Detects	2.018		
2463					Skewness Detects	4.417			Kurtosis Detects	22.66		
2464					Mean of Logged Detects	-1.094			SD of Logged Detects	1.148		
2465												
2466	**Normal GOF Test on Detects Only**											
2467					Shapiro Wilk Test Statistic	0.464			**Normal GOF Test on Detected Observations Only**			
2468					5% Shapiro Wilk P Value	0			Detected Data Not Normal at 5% Significance Level			
2469					Lilliefors Test Statistic	0.319			**Lilliefors GOF Test**			
2470					5% Lilliefors Critical Value	0.0637			Detected Data Not Normal at 5% Significance Level			
2471	**Detected Data Not Normal at 5% Significance Level**											
2472												
2473	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2474					KM Mean	0.532			KM Standard Error of Mean	0.0726		
2475					KM SD	1.272			95% KM (BCA) UCL	0.662		
2476					95% KM (t) UCL	0.652			95% KM (Percentile Bootstrap) UCL	0.66		
2477					95% KM (z) UCL	0.651			95% KM Bootstrap t UCL	0.699		
2478					90% KM Chebyshev UCL	0.75			95% KM Chebyshev UCL	0.848		
2479					97.5% KM Chebyshev UCL	0.985			99% KM Chebyshev UCL	1.254		
2480												
2481	**Gamma GOF Tests on Detected Observations Only**											
2482					A-D Test Statistic	11.67			**Anderson-Darling GOF Test**			
2483					5% A-D Critical Value	0.799			Detected Data Not Gamma Distributed at 5% Significance Level			
2484					K-S Test Statistic	0.197			**Kolmogorov-Smirnov GOF**			
2485					5% K-S Critical Value	0.0674			Detected Data Not Gamma Distributed at 5% Significance Level			
2486	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2487												
2488	**Gamma Statistics on Detected Data Only**											
2489					k hat (MLE)	0.723			k star (bias corrected MLE)	0.716		
2490					Theta hat (MLE)	1.063			Theta star (bias corrected MLE)	1.075		
2491					nu hat (MLE)	283.5			nu star (bias corrected)	280.5		
2492					Mean (detects)	0.769						
2493												
2494	**Gamma ROS Statistics using Imputed Non-Detects**											
2495	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2496	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

	A	B	C	D	E	F	G	H	I	J	K	L
2497	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2498	This is especially true when the sample size is small.											
2499	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2500					Minimum	0.01			Mean			0.492
2501					Maximum	12			Median			0.14
2502					SD	1.288			CV			2.617
2503					k hat (MLE)	0.399			k star (bias corrected MLE)			0.398
2504					Theta hat (MLE)	1.232			Theta star (bias corrected MLE)			1.238
2505					nu hat (MLE)	246.8			nu star (bias corrected)			245.7
2506					Adjusted Level of Significance (β)	0.0492						
2507					Approximate Chi Square Value (245.70, α)	210.4			Adjusted Chi Square Value (245.70, β)			210.3
2508					95% Gamma Approximate UCL (use when n>=50)	0.575			95% Gamma Adjusted UCL (use when n<50)			0.575
2509												
2510	**Estimates of Gamma Parameters using KM Estimates**											
2511					Mean (KM)	0.532			SD (KM)			1.272
2512					Variance (KM)	1.619			SE of Mean (KM)			0.0726
2513					k hat (KM)	0.175			k star (KM)			0.175
2514					nu hat (KM)	108.1			nu star (KM)			108.3
2515					theta hat (KM)	3.042			theta star (KM)			3.034
2516					80% gamma percentile (KM)	0.649			90% gamma percentile (KM)			1.602
2517					95% gamma percentile (KM)	2.832			99% gamma percentile (KM)			6.295
2518												
2519	**Gamma Kaplan-Meier (KM) Statistics**											
2520					Approximate Chi Square Value (108.34, α)	85.32			Adjusted Chi Square Value (108.34, β)			85.22
2521					95% Gamma Approximate KM-UCL (use when n>=50)	0.676			95% Gamma Adjusted KM-UCL (use when n<50)			0.676
2522												
2523	**Lognormal GOF Test on Detected Observations Only**											
2524					Shapiro Wilk Approximate Test Statistic	0.946			**Shapiro Wilk GOF Test**			
2525					5% Shapiro Wilk P Value	1.9393E-7			Detected Data Not Lognormal at 5% Significance Level			
2526					Lilliefors Test Statistic	0.0843			**Lilliefors GOF Test**			
2527					5% Lilliefors Critical Value	0.0637			Detected Data Not Lognormal at 5% Significance Level			
2528	**Detected Data Not Lognormal at 5% Significance Level**											
2529												
2530	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2531					Mean in Original Scale	0.533			Mean in Log Scale			-1.521
2532					SD in Original Scale	1.274			SD in Log Scale			1.136
2533					95% t UCL (assumes normality of ROS data)	0.652			95% Percentile Bootstrap UCL			0.657
2534					95% BCA Bootstrap UCL	0.673			95% Bootstrap t UCL			0.672
2535					95% H-UCL (Log ROS)	0.482						
2536												
2537	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2538					KM Mean (logged)	-1.502			KM Geo Mean			0.223
2539					KM SD (logged)	1.093			95% Critical H Value (KM-Log)			2.194
2540					KM Standard Error of Mean (logged)	0.0669			95% H-UCL (KM -Log)			0.464
2541					KM SD (logged)	1.093			95% Critical H Value (KM-Log)			2.194
2542					KM Standard Error of Mean (logged)	0.0669						
2543												
2544	**DL/2 Statistics**											
2545	**DL/2 Normal**								**DL/2 Log-Transformed**			
2546					Mean in Original Scale	0.528			Mean in Log Scale			-1.506
2547					SD in Original Scale	1.275			SD in Log Scale			1.068
2548					95% t UCL (Assumes normality)	0.648			95% H-Stat UCL			0.447

	A	B	C	D	E	F	G	H	I	J	K	L
2549	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2550												
2551	**Nonparametric Distribution Free UCL Statistics**											
2552	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2553												
2554	**Suggested UCL to Use**											
2555	95% KM (Chebyshev) UCL	0.848										
2556												
2557	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2558	Recommendations are based upon data size, data distribution, and skewness.											
2559	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2560	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2561												
2562	**Val_BENZOBFLUORANTHENE**											
2563												
2564	**General Statistics**											
2565	Total Number of Observations	309				Number of Distinct Observations	123					
2566	Number of Detects	208				Number of Non-Detects	101					
2567	Number of Distinct Detects	122				Number of Distinct Non-Detects	17					
2568	Minimum Detect	0.045				Minimum Non-Detect	0.18					
2569	Maximum Detect	19.1				Maximum Non-Detect	0.49					
2570	Variance Detects	3.986				Percent Non-Detects	32.69%					
2571	Mean Detects	0.957				SD Detects	1.997					
2572	Median Detects	0.393				CV Detects	2.087					
2573	Skewness Detects	5.527				Kurtosis Detects	38.82					
2574	Mean of Logged Detects	-0.865				SD of Logged Detects	1.169					
2575												
2576	**Normal GOF Test on Detects Only**											
2577	Shapiro Wilk Test Statistic	0.446				**Normal GOF Test on Detected Observations Only**						
2578	5% Shapiro Wilk P Value	0				Detected Data Not Normal at 5% Significance Level						
2579	Lilliefors Test Statistic	0.324				**Lilliefors GOF Test**						
2580	5% Lilliefors Critical Value	0.0619				Detected Data Not Normal at 5% Significance Level						
2581	**Detected Data Not Normal at 5% Significance Level**											
2582												
2583	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2584	KM Mean	0.683				KM Standard Error of Mean	0.0959					
2585	KM SD	1.681				95% KM (BCA) UCL	0.867					
2586	95% KM (t) UCL	0.841				95% KM (Percentile Bootstrap) UCL	0.853					
2587	95% KM (z) UCL	0.841				95% KM Bootstrap t UCL	0.909					
2588	90% KM Chebyshev UCL	0.971				95% KM Chebyshev UCL	1.101					
2589	97.5% KM Chebyshev UCL	1.282				99% KM Chebyshev UCL	1.637					
2590												
2591	**Gamma GOF Tests on Detected Observations Only**											
2592	A-D Test Statistic	9.251				**Anderson-Darling GOF Test**						
2593	5% A-D Critical Value	0.798				Detected Data Not Gamma Distributed at 5% Significance Level						
2594	K-S Test Statistic	0.167				**Kolmogorov-Smirnov GOF**						
2595	5% K-S Critical Value	0.0653				Detected Data Not Gamma Distributed at 5% Significance Level						
2596	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2597												
2598	**Gamma Statistics on Detected Data Only**											
2599	k hat (MLE)	0.732				k star (bias corrected MLE)	0.725					
2600	Theta hat (MLE)	1.307				Theta star (bias corrected MLE)	1.32					

	A	B	C	D	E	F	G	H	I	J	K	L
2601					nu hat (MLE)	304.5				nu star (bias corrected)		301.4
2602					Mean (detects)	0.957						
2603												
2604	**Gamma ROS Statistics using Imputed Non-Detects**											
2605	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2606	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2607	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2608	This is especially true when the sample size is small.											
2609	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2610					Minimum	0.01				Mean		0.647
2611					Maximum	19.1				Median		0.19
2612					SD	1.696				CV		2.62
2613					k hat (MLE)	0.398				k star (bias corrected MLE)		0.397
2614					Theta hat (MLE)	1.624				Theta star (bias corrected MLE)		1.631
2615					nu hat (MLE)	246.3				nu star (bias corrected)		245.2
2616					Adjusted Level of Significance (β)	0.0492						
2617					Approximate Chi Square Value (245.20, α)	209.9				Adjusted Chi Square Value (245.20, β)		209.8
2618					95% Gamma Approximate UCL (use when n>=50)	0.756				95% Gamma Adjusted UCL (use when n<50)		0.757
2619												
2620	**Estimates of Gamma Parameters using KM Estimates**											
2621					Mean (KM)	0.683				SD (KM)		1.681
2622					Variance (KM)	2.825				SE of Mean (KM)		0.0959
2623					k hat (KM)	0.165				k star (KM)		0.166
2624					nu hat (KM)	102				nu star (KM)		102.4
2625					theta hat (KM)	4.137				theta star (KM)		4.123
2626					80% gamma percentile (KM)	0.802				90% gamma percentile (KM)		2.048
2627					95% gamma percentile (KM)	3.682				99% gamma percentile (KM)		8.334
2628												
2629	**Gamma Kaplan-Meier (KM) Statistics**											
2630					Approximate Chi Square Value (102.37, α)	80.03				Adjusted Chi Square Value (102.37, β)		79.93
2631					95% Gamma Approximate KM-UCL (use when n>=50)	0.874				95% Gamma Adjusted KM-UCL (use when n<50)		0.875
2632												
2633	**Lognormal GOF Test on Detected Observations Only**											
2634					Shapiro Wilk Approximate Test Statistic	0.966				**Shapiro Wilk GOF Test**		
2635					5% Shapiro Wilk P Value	0.00261				Detected Data Not Lognormal at 5% Significance Level		
2636					Lilliefors Test Statistic	0.0583				**Lilliefors GOF Test**		
2637					5% Lilliefors Critical Value	0.0619				Detected Data appear Lognormal at 5% Significance Level		
2638	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
2639												
2640	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2641					Mean in Original Scale	0.683				Mean in Log Scale		-1.329
2642					SD in Original Scale	1.684				SD in Log Scale		1.221
2643					95% t UCL (assumes normality of ROS data)	0.841				95% Percentile Bootstrap UCL		0.861
2644					95% BCA Bootstrap UCL	0.884				95% Bootstrap t UCL		0.9
2645					95% H-UCL (Log ROS)	0.655						
2646												
2647	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2648					KM Mean (logged)	-1.308				KM Geo Mean		0.27
2649					KM SD (logged)	1.176				95% Critical H Value (KM-Log)		2.266
2650					KM Standard Error of Mean (logged)	0.071				95% H-UCL (KM -Log)		0.629
2651					KM SD (logged)	1.176				95% Critical H Value (KM-Log)		2.266
2652					KM Standard Error of Mean (logged)	0.071						

2653												
2654	**DL/2 Statistics**											
2655	**DL/2 Normal**						**DL/2 Log-Transformed**					
2656					Mean in Original Scale	0.68				Mean in Log Scale	-1.31	
2657					SD in Original Scale	1.684				SD in Log Scale	1.156	
2658					95% t UCL (Assumes normality)	0.838				95% H-Stat UCL	0.61	
2659	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2660												
2661	**Nonparametric Distribution Free UCL Statistics**											
2662	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
2663												
2664	**Suggested UCL to Use**											
2665					KM H-UCL	0.629						
2666												
2667	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2668	Recommendations are based upon data size, data distribution, and skewness.											
2669	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2670	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2671												
2672	**Val_BIS2_ETHYLHEXYL_PHTHALATE**											
2673												
2674	**General Statistics**											
2675					Total Number of Observations	309				Number of Distinct Observations	110	
2676					Number of Detects	164				Number of Non-Detects	145	
2677					Number of Distinct Detects	107				Number of Distinct Non-Detects	17	
2678					Minimum Detect	0.041				Minimum Non-Detect	0.19	
2679					Maximum Detect	180				Maximum Non-Detect	0.43	
2680					Variance Detects	290.1				Percent Non-Detects	46.93%	
2681					Mean Detects	3.324				SD Detects	17.03	
2682					Median Detects	0.3				CV Detects	5.124	
2683					Skewness Detects	8.413				Kurtosis Detects	78.23	
2684					Mean of Logged Detects	-0.909				SD of Logged Detects	1.515	
2685												
2686	**Normal GOF Test on Detects Only**											
2687					Shapiro Wilk Test Statistic	0.207	**Normal GOF Test on Detected Observations Only**					
2688					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
2689					Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**					
2690					5% Lilliefors Critical Value	0.0696	Detected Data Not Normal at 5% Significance Level					
2691	**Detected Data Not Normal at 5% Significance Level**											
2692												
2693	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2694					KM Mean	1.817				KM Standard Error of Mean	0.712	
2695					KM SD	12.47				95% KM (BCA) UCL	3.206	
2696					95% KM (t) UCL	2.992				95% KM (Percentile Bootstrap) UCL	3.097	
2697					95% KM (z) UCL	2.988				95% KM Bootstrap t UCL	4.496	
2698					90% KM Chebyshev UCL	3.953				95% KM Chebyshev UCL	4.92	
2699					97.5% KM Chebyshev UCL	6.263				99% KM Chebyshev UCL	8.9	
2700												
2701	**Gamma GOF Tests on Detected Observations Only**											
2702					A-D Test Statistic	24.7	**Anderson-Darling GOF Test**					
2703					5% A-D Critical Value	0.863	Detected Data Not Gamma Distributed at 5% Significance Level					
2704					K-S Test Statistic	0.304	**Kolmogorov-Smirnov GOF**					

	A	B	C	D	E	F	G	H	I	J	K	L
2705					5% K-S Critical Value	0.079	Detected Data Not Gamma Distributed at 5% Significance Level					
2706	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2707												
2708	**Gamma Statistics on Detected Data Only**											
2709					k hat (MLE)	0.323				k star (bias corrected MLE)		0.321
2710					Theta hat (MLE)	10.3				Theta star (bias corrected MLE)		10.35
2711					nu hat (MLE)	105.9				nu star (bias corrected)		105.3
2712					Mean (detects)	3.324						
2713												
2714	**Gamma ROS Statistics using Imputed Non-Detects**											
2715	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2716	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2717	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2718	This is especially true when the sample size is small.											
2719	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2720					Minimum	0.01				Mean		1.769
2721					Maximum	180				Median		0.063
2722					SD	12.5				CV		7.067
2723					k hat (MLE)	0.225				k star (bias corrected MLE)		0.225
2724					Theta hat (MLE)	7.869				Theta star (bias corrected MLE)		7.87
2725					nu hat (MLE)	138.9				nu star (bias corrected)		138.9
2726					Adjusted Level of Significance (β)	0.0492						
2727					Approximate Chi Square Value (138.91, α)	112.7				Adjusted Chi Square Value (138.91, β)		112.6
2728					95% Gamma Approximate UCL (use when n>=50)	2.181				95% Gamma Adjusted UCL (use when n<50)		2.183
2729												
2730	**Estimates of Gamma Parameters using KM Estimates**											
2731					Mean (KM)	1.817				SD (KM)		12.47
2732					Variance (KM)	155.6				SE of Mean (KM)		0.712
2733					k hat (KM)	0.0212				k star (KM)		0.0232
2734					nu hat (KM)	13.11				nu star (KM)		14.32
2735					theta hat (KM)	85.64				theta star (KM)		78.43
2736					80% gamma percentile (KM)	0.00295				90% gamma percentile (KM)		0.478
2737					95% gamma percentile (KM)	5.229				99% gamma percentile (KM)		49.7
2738												
2739	**Gamma Kaplan-Meier (KM) Statistics**											
2740					Approximate Chi Square Value (14.32, α)	6.791				Adjusted Chi Square Value (14.32, β)		6.767
2741					95% Gamma Approximate KM-UCL (use when n>=50)	3.832				95% Gamma Adjusted KM-UCL (use when n<50)		3.846
2742												
2743	**Lognormal GOF Test on Detected Observations Only**											
2744					Shapiro Wilk Approximate Test Statistic	0.891	**Shapiro Wilk GOF Test**					
2745					5% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 5% Significance Level					
2746					Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**					
2747					5% Lilliefors Critical Value	0.0696	Detected Data Not Lognormal at 5% Significance Level					
2748	**Detected Data Not Lognormal at 5% Significance Level**											
2749												
2750	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2751					Mean in Original Scale	1.818				Mean in Log Scale		-1.631
2752					SD in Original Scale	12.5				SD in Log Scale		1.463
2753					95% t UCL (assumes normality of ROS data)	2.991				95% Percentile Bootstrap UCL		3.12
2754					95% BCA Bootstrap UCL	3.722				95% Bootstrap t UCL		4.961
2755					95% H-UCL (Log ROS)	0.705						
2756												

	A	B	C	D	E	F	G	H	I	J	K	L
2757	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2758					KM Mean (logged)	-1.551				KM Geo Mean		0.212
2759					KM SD (logged)	1.332				95% Critical H Value (KM-Log)		2.407
2760				KM Standard Error of Mean (logged)		0.0829				95% H-UCL (KM -Log)		0.618
2761					KM SD (logged)	1.332				95% Critical H Value (KM-Log)		2.407
2762				KM Standard Error of Mean (logged)		0.0829						
2763												
2764	**DL/2 Statistics**											
2765	**DL/2 Normal**						**DL/2 Log-Transformed**					
2766					Mean in Original Scale	1.815				Mean in Log Scale		-1.532
2767					SD in Original Scale	12.5				SD in Log Scale		1.29
2768					95% t UCL (Assumes normality)	2.988				95% H-Stat UCL		0.591
2769	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2770												
2771	**Nonparametric Distribution Free UCL Statistics**											
2772	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2773												
2774	**Suggested UCL to Use**											
2775					95% KM (Chebyshev) UCL	4.92						
2776												
2777	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2778	Recommendations are based upon data size, data distribution, and skewness.											
2779	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2780	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2781												
2782	**Val_DIBENZAHANTHRACENE**											
2783												
2784	**General Statistics**											
2785					Total Number of Observations	309				Number of Distinct Observations		71
2786					Number of Detects	96				Number of Non-Detects		213
2787					Number of Distinct Detects	64				Number of Distinct Non-Detects		20
2788					Minimum Detect	0.026				Minimum Non-Detect		0.18
2789					Maximum Detect	3.1				Maximum Non-Detect		0.49
2790					Variance Detects	0.218				Percent Non-Detects		68.93%
2791					Mean Detects	0.281				SD Detects		0.466
2792					Median Detects	0.14				CV Detects		1.658
2793					Skewness Detects	4.067				Kurtosis Detects		19.05
2794					Mean of Logged Detects	-1.872				SD of Logged Detects		0.983
2795												
2796	**Normal GOF Test on Detects Only**											
2797					Shapiro Wilk Test Statistic	0.514	**Normal GOF Test on Detected Observations Only**					
2798					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
2799					Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**					
2800					5% Lilliefors Critical Value	0.0907	Detected Data Not Normal at 5% Significance Level					
2801	**Detected Data Not Normal at 5% Significance Level**											
2802												
2803	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2804					KM Mean	0.157				KM Standard Error of Mean		0.0164
2805					KM SD	0.275				95% KM (BCA) UCL		0.186
2806					95% KM (t) UCL	0.184				95% KM (Percentile Bootstrap) UCL		0.186
2807					95% KM (z) UCL	0.184				95% KM Bootstrap t UCL		0.194
2808					90% KM Chebyshev UCL	0.206				95% KM Chebyshev UCL		0.228

	A	B	C	D	E	F	G	H	I	J	K	L
2809					97.5% KM Chebyshev UCL	0.259				99% KM Chebyshev UCL		0.32
2810												
2811					**Gamma GOF Tests on Detected Observations Only**							
2812					A-D Test Statistic	5.026	**Anderson-Darling GOF Test**					
2813					5% A-D Critical Value	0.785	Detected Data Not Gamma Distributed at 5% Significance Level					
2814					K-S Test Statistic	0.187	**Kolmogorov-Smirnov GOF**					
2815					5% K-S Critical Value	0.0942	Detected Data Not Gamma Distributed at 5% Significance Level					
2816					**Detected Data Not Gamma Distributed at 5% Significance Level**							
2817												
2818					**Gamma Statistics on Detected Data Only**							
2819					k hat (MLE)	0.96				k star (bias corrected MLE)		0.937
2820					Theta hat (MLE)	0.293				Theta star (bias corrected MLE)		0.3
2821					nu hat (MLE)	184.3				nu star (bias corrected)		179.8
2822					Mean (detects)	0.281						
2823												
2824					**Gamma ROS Statistics using Imputed Non-Detects**							
2825					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
2826					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
2827					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
2828					This is especially true when the sample size is small.							
2829					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
2830					Minimum	0.01				Mean		0.146
2831					Maximum	3.1				Median		0.068
2832					SD	0.289				CV		1.975
2833					k hat (MLE)	0.634				k star (bias corrected MLE)		0.63
2834					Theta hat (MLE)	0.231				Theta star (bias corrected MLE)		0.232
2835					nu hat (MLE)	391.9				nu star (bias corrected)		389.5
2836					Adjusted Level of Significance (β)	0.0492						
2837					Approximate Chi Square Value (389.46, α)	344.7				Adjusted Chi Square Value (389.46, β)		344.5
2838					95% Gamma Approximate UCL (use when n>=50)	0.165				95% Gamma Adjusted UCL (use when n<50)		0.165
2839												
2840					**Estimates of Gamma Parameters using KM Estimates**							
2841					Mean (KM)	0.157				SD (KM)		0.275
2842					Variance (KM)	0.0755				SE of Mean (KM)		0.0164
2843					k hat (KM)	0.327				k star (KM)		0.326
2844					nu hat (KM)	201.9				nu star (KM)		201.3
2845					theta hat (KM)	0.481				theta star (KM)		0.482
2846					80% gamma percentile (KM)	0.245				90% gamma percentile (KM)		0.458
2847					95% gamma percentile (KM)	0.699				99% gamma percentile (KM)		1.32
2848												
2849					**Gamma Kaplan-Meier (KM) Statistics**							
2850					Approximate Chi Square Value (201.25, α)	169.4				Adjusted Chi Square Value (201.25, β)		169.3
2851					95% Gamma Approximate KM-UCL (use when n>=50)	0.187				95% Gamma Adjusted KM-UCL (use when n<50)		0.187
2852												
2853					**Lognormal GOF Test on Detected Observations Only**							
2854					Shapiro Wilk Approximate Test Statistic	0.944	**Shapiro Wilk GOF Test**					
2855					5% Shapiro Wilk P Value	8.9689E-4	Detected Data Not Lognormal at 5% Significance Level					
2856					Lilliefors Test Statistic	0.0911	**Lilliefors GOF Test**					
2857					5% Lilliefors Critical Value	0.0907	Detected Data Not Lognormal at 5% Significance Level					
2858					**Detected Data Not Lognormal at 5% Significance Level**							
2859												
2860					**Lognormal ROS Statistics Using Imputed Non-Detects**							

2861					Mean in Original Scale	0.162					Mean in Log Scale	-2.233
2862					SD in Original Scale	0.276					SD in Log Scale	0.783
2863				95% t UCL (assumes normality of ROS data)		0.188					95% Percentile Bootstrap UCL	0.189
2864					95% BCA Bootstrap UCL	0.198					95% Bootstrap t UCL	0.2
2865					95% H-UCL (Log ROS)	0.159						
2866												
2867	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2868					KM Mean (logged)	-2.249					KM Geo Mean	0.106
2869					KM SD (logged)	0.74					95% Critical H Value (KM-Log)	1.928
2870				KM Standard Error of Mean (logged)		0.0657					95% H-UCL (KM -Log)	0.15
2871					KM SD (logged)	0.74					95% Critical H Value (KM-Log)	1.928
2872				KM Standard Error of Mean (logged)		0.0657						
2873												
2874	**DL/2 Statistics**											
2875	**DL/2 Normal**						**DL/2 Log-Transformed**					
2876					Mean in Original Scale	0.162					Mean in Log Scale	-2.122
2877					SD in Original Scale	0.272					SD in Log Scale	0.583
2878					95% t UCL (Assumes normality)	0.188					95% H-Stat UCL	0.151
2879	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2880												
2881	**Nonparametric Distribution Free UCL Statistics**											
2882	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2883												
2884	**Suggested UCL to Use**											
2885					95% KM (Chebyshev) UCL	0.228						
2886												
2887	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2888	Recommendations are based upon data size, data distribution, and skewness.											
2889	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2890	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2891												
2892	**Val_INDENO123_CDPYRENE**											
2893												
2894	**General Statistics**											
2895					Total Number of Observations	309					Number of Distinct Observations	111
2896					Number of Detects	178					Number of Non-Detects	131
2897					Number of Distinct Detects	111					Number of Distinct Non-Detects	18
2898					Minimum Detect	0.043					Minimum Non-Detect	0.18
2899					Maximum Detect	9.5					Maximum Non-Detect	0.49
2900					Variance Detects	0.947					Percent Non-Detects	42.39%
2901					Mean Detects	0.484					SD Detects	0.973
2902					Median Detects	0.215					CV Detects	2.011
2903					Skewness Detects	5.942					Kurtosis Detects	45.55
2904					Mean of Logged Detects	-1.418					SD of Logged Detects	1.03
2905												
2906	**Normal GOF Test on Detects Only**											
2907					Shapiro Wilk Test Statistic	0.437	**Normal GOF Test on Detected Observations Only**					
2908					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
2909					Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**					
2910					5% Lilliefors Critical Value	0.0668	Detected Data Not Normal at 5% Significance Level					
2911	**Detected Data Not Normal at 5% Significance Level**											
2912												

	A	B	C	D	E	F	G	H	I	J	K	L
2913	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2914					KM Mean	0.329				KM Standard Error of Mean		0.0434
2915					KM SD	0.759				95% KM (BCA) UCL		0.404
2916					95% KM (t) UCL	0.401				95% KM (Percentile Bootstrap) UCL		0.408
2917					95% KM (z) UCL	0.4				95% KM Bootstrap t UCL		0.443
2918					90% KM Chebyshev UCL	0.459				95% KM Chebyshev UCL		0.518
2919					97.5% KM Chebyshev UCL	0.6				99% KM Chebyshev UCL		0.761
2920												
2921	**Gamma GOF Tests on Detected Observations Only**											
2922					A-D Test Statistic	9.632	**Anderson-Darling GOF Test**					
2923					5% A-D Critical Value	0.791	Detected Data Not Gamma Distributed at 5% Significance Level					
2924					K-S Test Statistic	0.172	**Kolmogorov-Smirnov GOF**					
2925					5% K-S Critical Value	0.0718	Detected Data Not Gamma Distributed at 5% Significance Level					
2926	**Detected Data Not Gamma Distributed at 5% Significance Level**											
2927												
2928	**Gamma Statistics on Detected Data Only**											
2929					k hat (MLE)	0.851				k star (bias corrected MLE)		0.841
2930					Theta hat (MLE)	0.568				Theta star (bias corrected MLE)		0.575
2931					nu hat (MLE)	303.1				nu star (bias corrected)		299.3
2932					Mean (detects)	0.484						
2933												
2934	**Gamma ROS Statistics using Imputed Non-Detects**											
2935	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
2936	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
2937	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
2938	This is especially true when the sample size is small.											
2939	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
2940					Minimum	0.01				Mean		0.297
2941					Maximum	9.5				Median		0.12
2942					SD	0.771				CV		2.598
2943					k hat (MLE)	0.49				k star (bias corrected MLE)		0.487
2944					Theta hat (MLE)	0.606				Theta star (bias corrected MLE)		0.609
2945					nu hat (MLE)	302.6				nu star (bias corrected)		301
2946					Adjusted Level of Significance (β)	0.0492						
2947					Approximate Chi Square Value (300.96, α)	261.8				Adjusted Chi Square Value (300.96, β)		261.6
2948					95% Gamma Approximate UCL (use when n>=50)	0.341				95% Gamma Adjusted UCL (use when n<50)		0.341
2949												
2950	**Estimates of Gamma Parameters using KM Estimates**											
2951					Mean (KM)	0.329				SD (KM)		0.759
2952					Variance (KM)	0.576				SE of Mean (KM)		0.0434
2953					k hat (KM)	0.188				k star (KM)		0.188
2954					nu hat (KM)	116.2				nu star (KM)		116.4
2955					theta hat (KM)	1.75				theta star (KM)		1.747
2956					80% gamma percentile (KM)	0.42				90% gamma percentile (KM)		0.994
2957					95% gamma percentile (KM)	1.721				99% gamma percentile (KM)		3.744
2958												
2959	**Gamma Kaplan-Meier (KM) Statistics**											
2960					Approximate Chi Square Value (116.42, α)	92.51				Adjusted Chi Square Value (116.42, β)		92.41
2961					95% Gamma Approximate KM-UCL (use when n>=50)	0.414				95% Gamma Adjusted KM-UCL (use when n<50)		0.415
2962												
2963	**Lognormal GOF Test on Detected Observations Only**											
2964					Shapiro Wilk Approximate Test Statistic	0.947	**Shapiro Wilk GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
2965					5% Shapiro Wilk P Value	1.4603E-6	Detected Data Not Lognormal at 5% Significance Level					
2966					Lilliefors Test Statistic	0.0732	**Lilliefors GOF Test**					
2967					5% Lilliefors Critical Value	0.0668	Detected Data Not Lognormal at 5% Significance Level					
2968	**Detected Data Not Lognormal at 5% Significance Level**											
2969												
2970	**Lognormal ROS Statistics Using Imputed Non-Detects**											
2971					Mean in Original Scale	0.332				Mean in Log Scale	-1.758	
2972					SD in Original Scale	0.76				SD in Log Scale	0.954	
2973				95% t UCL (assumes normality of ROS data)		0.403				95% Percentile Bootstrap UCL	0.41	
2974					95% BCA Bootstrap UCL	0.435				95% Bootstrap t UCL	0.444	
2975					95% H-UCL (Log ROS)	0.304						
2976												
2977	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
2978					KM Mean (logged)	-1.76				KM Geo Mean	0.172	
2979					KM SD (logged)	0.924				95% Critical H Value (KM-Log)	2.059	
2980					KM Standard Error of Mean (logged)	0.0588				95% H-UCL (KM -Log)	0.294	
2981					KM SD (logged)	0.924				95% Critical H Value (KM-Log)	2.059	
2982					KM Standard Error of Mean (logged)	0.0588						
2983												
2984	**DL/2 Statistics**											
2985	**DL/2 Normal**						**DL/2 Log-Transformed**					
2986					Mean in Original Scale	0.325				Mean in Log Scale	-1.76	
2987					SD in Original Scale	0.761				SD in Log Scale	0.884	
2988					95% t UCL (Assumes normality)	0.396				95% H-Stat UCL	0.281	
2989	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2990												
2991	**Nonparametric Distribution Free UCL Statistics**											
2992	**Data do not follow a Discernible Distribution at 5% Significance Level**											
2993												
2994	**Suggested UCL to Use**											
2995					95% KM (Chebyshev) UCL	0.518						
2996												
2997	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2998	Recommendations are based upon data size, data distribution, and skewness.											
2999	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3000	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3001												
3002	**Val_44__DDT**											
3003												
3004	**General Statistics**											
3005					Total Number of Observations	291				Number of Distinct Observations	85	
3006					Number of Detects	26				Number of Non-Detects	265	
3007					Number of Distinct Detects	25				Number of Distinct Non-Detects	62	
3008					Minimum Detect	0.0012				Minimum Non-Detect	0.0018	
3009					Maximum Detect	11				Maximum Non-Detect	0.0095	
3010					Variance Detects	4.636				Percent Non-Detects	91.07%	
3011					Mean Detects	0.537				SD Detects	2.153	
3012					Median Detects	0.0128				CV Detects	4.009	
3013					Skewness Detects	4.963				Kurtosis Detects	24.98	
3014					Mean of Logged Detects	-3.765				SD of Logged Detects	2.322	
3015												
3016	**Normal GOF Test on Detects Only**											

3017	Shapiro Wilk Test Statistic					0.266	**Shapiro Wilk GOF Test**					
3018	5% Shapiro Wilk Critical Value					0.92	Detected Data Not Normal at 5% Significance Level					
3019	Lilliefors Test Statistic					0.436	**Lilliefors GOF Test**					
3020	5% Lilliefors Critical Value					0.17	Detected Data Not Normal at 5% Significance Level					
3021	**Detected Data Not Normal at 5% Significance Level**											
3022												
3023	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
3024	KM Mean					0.0492	KM Standard Error of Mean					0.0388
3025	KM SD					0.649	95% KM (BCA) UCL					0.122
3026	95% KM (t) UCL					0.113	95% KM (Percentile Bootstrap) UCL					0.123
3027	95% KM (z) UCL					0.113	95% KM Bootstrap t UCL					0.884
3028	90% KM Chebyshev UCL					0.166	95% KM Chebyshev UCL					0.218
3029	97.5% KM Chebyshev UCL					0.292	99% KM Chebyshev UCL					0.435
3030												
3031	**Gamma GOF Tests on Detected Observations Only**											
3032	A-D Test Statistic					3.062	**Anderson-Darling GOF Test**					
3033	5% A-D Critical Value					0.887	Detected Data Not Gamma Distributed at 5% Significance Level					
3034	K-S Test Statistic					0.275	**Kolmogorov-Smirnov GOF**					
3035	5% K-S Critical Value					0.189	Detected Data Not Gamma Distributed at 5% Significance Level					
3036	**Detected Data Not Gamma Distributed at 5% Significance Level**											
3037												
3038	**Gamma Statistics on Detected Data Only**											
3039	k hat (MLE)					0.229	k star (bias corrected MLE)					0.228
3040	Theta hat (MLE)					2.344	Theta star (bias corrected MLE)					2.352
3041	nu hat (MLE)					11.92	nu star (bias corrected)					11.87
3042	Mean (detects)					0.537						
3043												
3044	**Gamma ROS Statistics using Imputed Non-Detects**											
3045	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3046	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
3047	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3048	This is especially true when the sample size is small.											
3049	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3050	Minimum					0.0012	Mean					0.0571
3051	Maximum					11	Median					0.01
3052	SD					0.65	CV					11.38
3053	k hat (MLE)					0.395	k star (bias corrected MLE)					0.394
3054	Theta hat (MLE)					0.144	Theta star (bias corrected MLE)					0.145
3055	nu hat (MLE)					230.2	nu star (bias corrected)					229.1
3056	Adjusted Level of Significance (β)					0.0492						
3057	Approximate Chi Square Value (229.13, α)					195.1	Adjusted Chi Square Value (229.13, β)					194.9
3058	95% Gamma Approximate UCL (use when n>=50)					0.0671	95% Gamma Adjusted UCL (use when n<50)					0.0671
3059												
3060	**Estimates of Gamma Parameters using KM Estimates**											
3061	Mean (KM)					0.0492	SD (KM)					0.649
3062	Variance (KM)					0.422	SE of Mean (KM)					0.0388
3063	k hat (KM)					0.00575	k star (KM)					0.00798
3064	nu hat (KM)					3.345	nu star (KM)					4.644
3065	theta hat (KM)					8.565	theta star (KM)					6.169
3066	80% gamma percentile (KM)					2.495E-12	90% gamma percentile (KM)					6.4240E-6
3067	95% gamma percentile (KM)					0.00564	99% gamma percentile (KM)					1.187
3068												

	A	B	C	D	E	F	G	H	I	J	K	L
3069	**Gamma Kaplan-Meier (KM) Statistics**											
3070	Approximate Chi Square Value (4.64, α)					0.991	Adjusted Chi Square Value (4.64, β)					0.983
3071	95% Gamma Approximate KM-UCL (use when n>=50)					0.231	95% Gamma Adjusted KM-UCL (use when n<50)					0.232
3072												
3073	**Lognormal GOF Test on Detected Observations Only**											
3074	Shapiro Wilk Test Statistic					0.93	**Shapiro Wilk GOF Test**					
3075	5% Shapiro Wilk Critical Value					0.92	Detected Data appear Lognormal at 5% Significance Level					
3076	Lilliefors Test Statistic					0.148	**Lilliefors GOF Test**					
3077	5% Lilliefors Critical Value					0.17	Detected Data appear Lognormal at 5% Significance Level					
3078	**Detected Data appear Lognormal at 5% Significance Level**											
3079												
3080	**Lognormal ROS Statistics Using Imputed Non-Detects**											
3081	Mean in Original Scale					0.0493	Mean in Log Scale					-7.15
3082	SD in Original Scale					0.65	SD in Log Scale					1.913
3083	95% t UCL (assumes normality of ROS data)					0.112	95% Percentile Bootstrap UCL					0.124
3084	95% BCA Bootstrap UCL					0.196	95% Bootstrap t UCL					0.914
3085	95% H-UCL (Log ROS)					0.00689						
3086												
3087	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
3088	KM Mean (logged)					-6.356	KM Geo Mean					0.00174
3089	KM SD (logged)					1.069	95% Critical H Value (KM-Log)					2.194
3090	KM Standard Error of Mean (logged)					0.0799	95% H-UCL (KM -Log)					0.00353
3091	KM SD (logged)					1.069	95% Critical H Value (KM-Log)					2.194
3092	KM Standard Error of Mean (logged)					0.0799						
3093												
3094	**DL/2 Statistics**											
3095	**DL/2 Normal**						**DL/2 Log-Transformed**					
3096	Mean in Original Scale					0.0498	Mean in Log Scale					-6.026
3097	SD in Original Scale					0.65	SD in Log Scale					1.011
3098	95% t UCL (Assumes normality)					0.113	95% H-Stat UCL					0.00457
3099	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
3100												
3101	**Nonparametric Distribution Free UCL Statistics**											
3102	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
3103												
3104	**Suggested UCL to Use**											
3105	KM H-UCL					0.00353						
3106												
3107	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3108	Recommendations are based upon data size, data distribution, and skewness.											
3109	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3110	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3111												
3112	**Val_DIELDRIN**											
3113												
3114	**General Statistics**											
3115	Total Number of Observations					292	Number of Distinct Observations					74
3116	Number of Detects					17	Number of Non-Detects					275
3117	Number of Distinct Detects					16	Number of Distinct Non-Detects					63
3118	Minimum Detect					0.0014	Minimum Non-Detect					0.0018
3119	Maximum Detect					1.7	Maximum Non-Detect					0.0095
3120	Variance Detects					0.168	Percent Non-Detects					94.18%

	A	B	C	D	E	F	G	H	I	J	K	L
3121					Mean Detects	0.109					SD Detects	0.41
3122					Median Detects	0.0073					CV Detects	3.748
3123					Skewness Detects	4.115					Kurtosis Detects	16.95
3124					Mean of Logged Detects	-4.873					SD of Logged Detects	1.748
3125												
3126					**Normal GOF Test on Detects Only**							
3127					Shapiro Wilk Test Statistic	0.283	**Shapiro Wilk GOF Test**					
3128					5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level					
3129					Lilliefors Test Statistic	0.49	**Lilliefors GOF Test**					
3130					5% Lilliefors Critical Value	0.207	Detected Data Not Normal at 5% Significance Level					
3131					**Detected Data Not Normal at 5% Significance Level**							
3132												
3133					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
3134					KM Mean	0.00797	KM Standard Error of Mean					0.00599
3135					KM SD	0.0993	95% KM (BCA) UCL					0.0252
3136					95% KM (t) UCL	0.0178	95% KM (Percentile Bootstrap) UCL					0.0196
3137					95% KM (z) UCL	0.0178	95% KM Bootstrap t UCL					0.305
3138					90% KM Chebyshev UCL	0.0259	95% KM Chebyshev UCL					0.0341
3139					97.5% KM Chebyshev UCL	0.0454	99% KM Chebyshev UCL					0.0675
3140												
3141					**Gamma GOF Tests on Detected Observations Only**							
3142					A-D Test Statistic	3.385	**Anderson-Darling GOF Test**					
3143					5% A-D Critical Value	0.857	Detected Data Not Gamma Distributed at 5% Significance Level					
3144					K-S Test Statistic	0.407	**Kolmogorov-Smirnov GOF**					
3145					5% K-S Critical Value	0.229	Detected Data Not Gamma Distributed at 5% Significance Level					
3146					**Detected Data Not Gamma Distributed at 5% Significance Level**							
3147												
3148					**Gamma Statistics on Detected Data Only**							
3149					k hat (MLE)	0.265	k star (bias corrected MLE)					0.257
3150					Theta hat (MLE)	0.414	Theta star (bias corrected MLE)					0.426
3151					nu hat (MLE)	8.995	nu star (bias corrected)					8.741
3152					Mean (detects)	0.109						
3153												
3154					**Gamma ROS Statistics using Imputed Non-Detects**							
3155					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
3156					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
3157					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
3158					This is especially true when the sample size is small.							
3159					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
3160					Minimum	0.0014	Mean					0.0161
3161					Maximum	1.7	Median					0.01
3162					SD	0.099	CV					6.149
3163					k hat (MLE)	1.185	k star (bias corrected MLE)					1.176
3164					Theta hat (MLE)	0.0136	Theta star (bias corrected MLE)					0.0137
3165					nu hat (MLE)	692.3	nu star (bias corrected)					686.5
3166					Adjusted Level of Significance (β)	0.0492						
3167					Approximate Chi Square Value (686.55, α)	626.8	Adjusted Chi Square Value (686.55, β)					626.5
3168					95% Gamma Approximate UCL (use when n>=50)	0.0176	95% Gamma Adjusted UCL (use when n<50)					0.0176
3169												
3170					**Estimates of Gamma Parameters using KM Estimates**							
3171					Mean (KM)	0.00797	SD (KM)					0.0993
3172					Variance (KM)	0.00985	SE of Mean (KM)					0.00599

3173					k hat (KM)	0.00644					k star (KM)	0.00866
3174					nu hat (KM)	3.761					nu star (KM)	5.056
3175					theta hat (KM)	1.237					theta star (KM)	0.92
3176					80% gamma percentile (KM)	3.322E-12					90% gamma percentile (KM)	2.6944E-6
3177					95% gamma percentile (KM)	0.00139					99% gamma percentile (KM)	0.2
3178												
3179	**Gamma Kaplan-Meier (KM) Statistics**											
3180					Approximate Chi Square Value (5.06, α)	1.178					Adjusted Chi Square Value (5.06, β)	1.169
3181					95% Gamma Approximate KM-UCL (use when n>=50)	0.0342					95% Gamma Adjusted KM-UCL (use when n<50)	0.0344
3182												
3183	**Lognormal GOF Test on Detected Observations Only**											
3184					Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**					
3185					5% Shapiro Wilk Critical Value	0.892	Detected Data Not Lognormal at 5% Significance Level					
3186					Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**					
3187					5% Lilliefors Critical Value	0.207	Detected Data appear Lognormal at 5% Significance Level					
3188	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
3189												
3190	**Lognormal ROS Statistics Using Imputed Non-Detects**											
3191					Mean in Original Scale	0.00755					Mean in Log Scale	-7.027
3192					SD in Original Scale	0.0995					SD in Log Scale	1.189
3193					95% t UCL (assumes normality of ROS data)	0.0172					95% Percentile Bootstrap UCL	0.0192
3194					95% BCA Bootstrap UCL	0.0307					95% Bootstrap t UCL	0.293
3195					95% H-UCL (Log ROS)	0.00211						
3196												
3197	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
3198					KM Mean (logged)	-6.313					KM Geo Mean	0.00181
3199					KM SD (logged)	0.577					95% Critical H Value (KM-Log)	1.84
3200					KM Standard Error of Mean (logged)	0.0628					95% H-UCL (KM -Log)	0.00228
3201					KM SD (logged)	0.577					95% Critical H Value (KM-Log)	1.84
3202					KM Standard Error of Mean (logged)	0.0628						
3203												
3204	**DL/2 Statistics**											
3205	**DL/2 Normal**						**DL/2 Log-Transformed**					
3206					Mean in Original Scale	0.00824					Mean in Log Scale	-6.166
3207					SD in Original Scale	0.0994					SD in Log Scale	0.571
3208					95% t UCL (Assumes normality)	0.0178					95% H-Stat UCL	0.00263
3209	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
3210												
3211	**Nonparametric Distribution Free UCL Statistics**											
3212	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
3213												
3214	**Suggested UCL to Use**											
3215					KM H-UCL	0.00228						
3216												
3217	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3218	Recommendations are based upon data size, data distribution, and skewness.											
3219	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3220	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3221												
3222	**Val_HEPTACHLOR_EPOXIDE**											
3223												
3224	**General Statistics**											

3225	Total Number of Observations					292	Number of Distinct Observations					67
3226	Number of Detects					17	Number of Non-Detects					275
3227	Number of Distinct Detects					17	Number of Distinct Non-Detects					56
3228	Minimum Detect					6.1000E-4	Minimum Non-Detect					9.4000E-4
3229	Maximum Detect					0.39	Maximum Non-Detect					0.0049
3230	Variance Detects					0.00948	Percent Non-Detects					94.18%
3231	Mean Detects					0.035	SD Detects					0.0974
3232	Median Detects					0.0032	CV Detects					2.785
3233	Skewness Detects					3.488	Kurtosis Detects					12.59
3234	Mean of Logged Detects					-5.402	SD of Logged Detects					1.741
3235												
3236	**Normal GOF Test on Detects Only**											
3237	Shapiro Wilk Test Statistic					0.402	**Shapiro Wilk GOF Test**					
3238	5% Shapiro Wilk Critical Value					0.892	Detected Data Not Normal at 5% Significance Level					
3239	Lilliefors Test Statistic					0.433	**Lilliefors GOF Test**					
3240	5% Lilliefors Critical Value					0.207	Detected Data Not Normal at 5% Significance Level					
3241	**Detected Data Not Normal at 5% Significance Level**											
3242												
3243	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
3244	KM Mean					0.00275	KM Standard Error of Mean					0.00146
3245	KM SD					0.0242	95% KM (BCA) UCL					0.00517
3246	95% KM (t) UCL					0.00516	95% KM (Percentile Bootstrap) UCL					0.00543
3247	95% KM (z) UCL					0.00515	95% KM Bootstrap t UCL					0.0332
3248	90% KM Chebyshev UCL					0.00713	95% KM Chebyshev UCL					0.00911
3249	97.5% KM Chebyshev UCL					0.0119	99% KM Chebyshev UCL					0.0173
3250												
3251	**Gamma GOF Tests on Detected Observations Only**											
3252	A-D Test Statistic					2.662	**Anderson-Darling GOF Test**					
3253	5% A-D Critical Value					0.835	Detected Data Not Gamma Distributed at 5% Significance Level					
3254	K-S Test Statistic					0.362	**Kolmogorov-Smirnov GOF**					
3255	5% K-S Critical Value					0.226	Detected Data Not Gamma Distributed at 5% Significance Level					
3256	**Detected Data Not Gamma Distributed at 5% Significance Level**											
3257												
3258	**Gamma Statistics on Detected Data Only**											
3259	k hat (MLE)					0.331	k star (bias corrected MLE)					0.312
3260	Theta hat (MLE)					0.106	Theta star (bias corrected MLE)					0.112
3261	nu hat (MLE)					11.26	nu star (bias corrected)					10.61
3262	Mean (detects)					0.035						
3263												
3264	**Gamma ROS Statistics using Imputed Non-Detects**											
3265	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3266	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
3267	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3268	This is especially true when the sample size is small.											
3269	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3270	Minimum					6.1000E-4	Mean					0.0115
3271	Maximum					0.39	Median					0.01
3272	SD					0.0236	CV					2.058
3273	k hat (MLE)					2.902	k star (bias corrected MLE)					2.874
3274	Theta hat (MLE)					0.00395	Theta star (bias corrected MLE)					0.00398
3275	nu hat (MLE)					1695	nu star (bias corrected)					1679
3276	Adjusted Level of Significance (β)					0.0492						

3277	Approximate Chi Square Value (N/A, α)					1584	Adjusted Chi Square Value (N/A, β)					1584
3278	95% Gamma Approximate UCL (use when n>=50)					0.0121	95% Gamma Adjusted UCL (use when n<50)					0.0121
3279												
3280	**Estimates of Gamma Parameters using KM Estimates**											
3281	Mean (KM)					0.00275	SD (KM)					0.0242
3282	Variance (KM)					5.8354E-4	SE of Mean (KM)					0.00146
3283	k hat (KM)					0.013	k star (KM)					0.0151
3284	nu hat (KM)					7.588	nu star (KM)					8.843
3285	theta hat (KM)					0.212	theta star (KM)					0.182
3286	80% gamma percentile (KM)					4.1174E-8	90% gamma percentile (KM)					9.8371E-5
3287	95% gamma percentile (KM)					0.00356	99% gamma percentile (KM)					0.078
3288												
3289	**Gamma Kaplan-Meier (KM) Statistics**											
3290	Approximate Chi Square Value (8.84, α)					3.233	Adjusted Chi Square Value (8.84, β)					3.216
3291	95% Gamma Approximate KM-UCL (use when n>=50)					0.00753	95% Gamma Adjusted KM-UCL (use when n<50)					0.00757
3292												
3293	**Lognormal GOF Test on Detected Observations Only**											
3294	Shapiro Wilk Test Statistic					0.839	**Shapiro Wilk GOF Test**					
3295	5% Shapiro Wilk Critical Value					0.892	Detected Data Not Lognormal at 5% Significance Level					
3296	Lilliefors Test Statistic					0.241	**Lilliefors GOF Test**					
3297	5% Lilliefors Critical Value					0.207	Detected Data Not Lognormal at 5% Significance Level					
3298	**Detected Data Not Lognormal at 5% Significance Level**											
3299												
3300	**Lognormal ROS Statistics Using Imputed Non-Detects**											
3301	Mean in Original Scale					0.00265	Mean in Log Scale					-7.659
3302	SD in Original Scale					0.0242	SD in Log Scale					1.201
3303	95% t UCL (assumes normality of ROS data)					0.00499	95% Percentile Bootstrap UCL					0.00535
3304	95% BCA Bootstrap UCL					0.00749	95% Bootstrap t UCL					0.0402
3305	95% H-UCL (Log ROS)					0.00114						
3306												
3307	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
3308	KM Mean (logged)					-7.089	KM Geo Mean					8.3424E-4
3309	KM SD (logged)					0.606	95% Critical H Value (KM-Log)					1.858
3310	KM Standard Error of Mean (logged)					0.0858	95% H-UCL (KM -Log)					0.00107
3311	KM SD (logged)					0.606	95% Critical H Value (KM-Log)					1.858
3312	KM Standard Error of Mean (logged)					0.0858						
3313												
3314	**DL/2 Statistics**											
3315	**DL/2 Normal**						**DL/2 Log-Transformed**					
3316	Mean in Original Scale					0.003	Mean in Log Scale					-6.825
3317	SD in Original Scale					0.0242	SD in Log Scale					0.59
3318	95% t UCL (Assumes normality)					0.00533	95% H-Stat UCL					0.00138
3319	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
3320												
3321	**Nonparametric Distribution Free UCL Statistics**											
3322	**Data do not follow a Discernible Distribution at 5% Significance Level**											
3323												
3324	**Suggested UCL to Use**											
3325	95% KM (Chebyshev) UCL					0.00911						
3326												
3327	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3328	Recommendations are based upon data size, data distribution, and skewness.											

3329	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3330	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3331												
3332	**Val_AROCLOR_1248**											
3333												
3334	**General Statistics**											
3335						Total Number of Observations	321			Number of Distinct Observations	99	
3336						Number of Detects	83			Number of Non-Detects	238	
3337						Number of Distinct Detects	69			Number of Distinct Non-Detects	31	
3338						Minimum Detect	0.062			Minimum Non-Detect	0.035	
3339						Maximum Detect	4300			Maximum Non-Detect	2	
3340						Variance Detects	259549			Percent Non-Detects	74.14%	
3341						Mean Detects	91.01			SD Detects	509.5	
3342						Median Detects	4.6			CV Detects	5.598	
3343						Skewness Detects	7.404			Kurtosis Detects	58.99	
3344						Mean of Logged Detects	1.469			SD of Logged Detects	1.832	
3345												
3346	**Normal GOF Test on Detects Only**											
3347						Shapiro Wilk Test Statistic	0.195		**Normal GOF Test on Detected Observations Only**			
3348						5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level			
3349						Lilliefors Test Statistic	0.474		**Lilliefors GOF Test**			
3350						5% Lilliefors Critical Value	0.0974		Detected Data Not Normal at 5% Significance Level			
3351	**Detected Data Not Normal at 5% Significance Level**											
3352												
3353	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
3354						KM Mean	23.56			KM Standard Error of Mean	14.63	
3355						KM SD	260.6			95% KM (BCA) UCL	53.59	
3356						95% KM (t) UCL	47.69			95% KM (Percentile Bootstrap) UCL	49.64	
3357						95% KM (z) UCL	47.62			95% KM Bootstrap t UCL	550.1	
3358						90% KM Chebyshev UCL	67.45			95% KM Chebyshev UCL	87.33	
3359						97.5% KM Chebyshev UCL	114.9			99% KM Chebyshev UCL	169.1	
3360												
3361	**Gamma GOF Tests on Detected Observations Only**											
3362						A-D Test Statistic	15.03		**Anderson-Darling GOF Test**			
3363						5% A-D Critical Value	0.898		Detected Data Not Gamma Distributed at 5% Significance Level			
3364						K-S Test Statistic	0.356		**Kolmogorov-Smirnov GOF**			
3365						5% K-S Critical Value	0.108		Detected Data Not Gamma Distributed at 5% Significance Level			
3366	**Detected Data Not Gamma Distributed at 5% Significance Level**											
3367												
3368	**Gamma Statistics on Detected Data Only**											
3369						k hat (MLE)	0.236			k star (bias corrected MLE)	0.235	
3370						Theta hat (MLE)	386.1			Theta star (bias corrected MLE)	386.9	
3371						nu hat (MLE)	39.13			nu star (bias corrected)	39.05	
3372						Mean (detects)	91.01					
3373												
3374	**Gamma ROS Statistics using Imputed Non-Detects**											
3375	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3376	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
3377	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3378	This is especially true when the sample size is small.											
3379	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3380						Minimum	0.01			Mean	23.54	

3381					Maximum	4300					Median	0.01
3382					SD	261					CV	11.09
3383					k hat (MLE)	0.127					k star (bias corrected MLE)	0.128
3384					Theta hat (MLE)	185.3					Theta star (bias corrected MLE)	184
3385					nu hat (MLE)	81.57					nu star (bias corrected)	82.14
3386					Adjusted Level of Significance (β)	0.0493						
3387					Approximate Chi Square Value (82.14, α)	62.25					Adjusted Chi Square Value (82.14, β)	62.18
3388					95% Gamma Approximate UCL (use when n>=50)	31.06					95% Gamma Adjusted UCL (use when n<50)	31.1
3389												
3390					**Estimates of Gamma Parameters using KM Estimates**							
3391					Mean (KM)	23.56					SD (KM)	260.6
3392					Variance (KM)	67889					SE of Mean (KM)	14.63
3393					k hat (KM)	0.00817					k star (KM)	0.0102
3394					nu hat (KM)	5.248					nu star (KM)	6.532
3395					theta hat (KM)	2882					theta star (KM)	2315
3396					80% gamma percentile (KM)	3.9176E-7					90% gamma percentile (KM)	0.0417
3397					95% gamma percentile (KM)	8.506					99% gamma percentile (KM)	627.7
3398												
3399					**Gamma Kaplan-Meier (KM) Statistics**							
3400					Approximate Chi Square Value (6.53, α)	1.918					Adjusted Chi Square Value (6.53, β)	1.906
3401					95% Gamma Approximate KM-UCL (use when n>=50)	80.25					95% Gamma Adjusted KM-UCL (use when n<50)	80.71
3402												
3403					**Lognormal GOF Test on Detected Observations Only**							
3404					Shapiro Wilk Approximate Test Statistic	0.925					**Shapiro Wilk GOF Test**	
3405					5% Shapiro Wilk P Value	6.0306E-5					Detected Data Not Lognormal at 5% Significance Level	
3406					Lilliefors Test Statistic	0.12					**Lilliefors GOF Test**	
3407					5% Lilliefors Critical Value	0.0974					Detected Data Not Lognormal at 5% Significance Level	
3408					**Detected Data Not Lognormal at 5% Significance Level**							
3409												
3410					**Lognormal ROS Statistics Using Imputed Non-Detects**							
3411					Mean in Original Scale	23.57					Mean in Log Scale	-2.987
3412					SD in Original Scale	261					SD in Log Scale	3.404
3413					95% t UCL (assumes normality of ROS data)	47.6					95% Percentile Bootstrap UCL	50.23
3414					95% BCA Bootstrap UCL	72.22					95% Bootstrap t UCL	102
3415					95% H-UCL (Log ROS)	40.83						
3416												
3417					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
3418					KM Mean (logged)	-2.105					KM Geo Mean	0.122
3419					KM SD (logged)	2.305					95% Critical H Value (KM-Log)	3.427
3420					KM Standard Error of Mean (logged)	0.129					95% H-UCL (KM -Log)	2.702
3421					KM SD (logged)	2.305					95% Critical H Value (KM-Log)	3.427
3422					KM Standard Error of Mean (logged)	0.129						
3423												
3424					**DL/2 Statistics**							
3425					**DL/2 Normal**						**DL/2 Log-Transformed**	
3426					Mean in Original Scale	23.55					Mean in Log Scale	-2.486
3427					SD in Original Scale	261					SD in Log Scale	2.528
3428					95% t UCL (Assumes normality)	47.58					95% H-Stat UCL	3.42
3429					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
3430												
3431					**Nonparametric Distribution Free UCL Statistics**							
3432					**Data do not follow a Discernible Distribution at 5% Significance Level**							

	A	B	C	D	E	F	G	H	I	J	K	L
3433												
3434	**Suggested UCL to Use**											
3435					95% KM (Chebyshev) UCL	87.33						
3436												
3437	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3438	Recommendations are based upon data size, data distribution, and skewness.											
3439	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3440	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3441												
3442	**Val_AROCLOR_1254**											
3443												
3444	**General Statistics**											
3445					Total Number of Observations	321			Number of Distinct Observations		138	
3446					Number of Detects	140			Number of Non-Detects		181	
3447					Number of Distinct Detects	125			Number of Distinct Non-Detects		20	
3448					Minimum Detect	0.013			Minimum Non-Detect		0.035	
3449					Maximum Detect	2100			Maximum Non-Detect		0.071	
3450					Variance Detects	49800			Percent Non-Detects		56.39%	
3451					Mean Detects	49.86			SD Detects		223.2	
3452					Median Detects	0.775			CV Detects		4.476	
3453					Skewness Detects	7.275			Kurtosis Detects		58.92	
3454					Mean of Logged Detects	0.288			SD of Logged Detects		2.742	
3455												
3456	**Normal GOF Test on Detects Only**											
3457					Shapiro Wilk Test Statistic	0.255		**Normal GOF Test on Detected Observations Only**				
3458					5% Shapiro Wilk P Value	0		Detected Data Not Normal at 5% Significance Level				
3459					Lilliefors Test Statistic	0.412		**Lilliefors GOF Test**				
3460					5% Lilliefors Critical Value	0.0753		Detected Data Not Normal at 5% Significance Level				
3461	**Detected Data Not Normal at 5% Significance Level**											
3462												
3463	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
3464					KM Mean	21.76			KM Standard Error of Mean		8.341	
3465					KM SD	148.9			95% KM (BCA) UCL		39.74	
3466					95% KM (t) UCL	35.52			95% KM (Percentile Bootstrap) UCL		37.3	
3467					95% KM (z) UCL	35.48			95% KM Bootstrap t UCL		59.13	
3468					90% KM Chebyshev UCL	46.78			95% KM Chebyshev UCL		58.12	
3469					97.5% KM Chebyshev UCL	73.85			99% KM Chebyshev UCL		104.8	
3470												
3471	**Gamma GOF Tests on Detected Observations Only**											
3472					A-D Test Statistic	12.22		**Anderson-Darling GOF Test**				
3473					5% A-D Critical Value	0.917		Detected Data Not Gamma Distributed at 5% Significance Level				
3474					K-S Test Statistic	0.208		**Kolmogorov-Smirnov GOF**				
3475					5% K-S Critical Value	0.0879		Detected Data Not Gamma Distributed at 5% Significance Level				
3476	**Detected Data Not Gamma Distributed at 5% Significance Level**											
3477												
3478	**Gamma Statistics on Detected Data Only**											
3479					k hat (MLE)	0.203			k star (bias corrected MLE)		0.203	
3480					Theta hat (MLE)	245.9			Theta star (bias corrected MLE)		245.4	
3481					nu hat (MLE)	56.78			nu star (bias corrected)		56.9	
3482					Mean (detects)	49.86						
3483												
3484	**Gamma ROS Statistics using Imputed Non-Detects**											

	A	B	C	D	E	F	G	H	I	J	K	L
3485	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3486	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
3487	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3488	This is especially true when the sample size is small.											
3489	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3490					Minimum	0.01				Mean		21.75
3491					Maximum	2100				Median		0.01
3492					SD	149.1				CV		6.857
3493					k hat (MLE)	0.14				k star (bias corrected MLE)		0.141
3494					Theta hat (MLE)	155.5				Theta star (bias corrected MLE)		154.7
3495					nu hat (MLE)	89.79				nu star (bias corrected)		90.29
3496					Adjusted Level of Significance (β)	0.0493						
3497					Approximate Chi Square Value (90.29, α)	69.38				Adjusted Chi Square Value (90.29, β)		69.3
3498					95% Gamma Approximate UCL (use when n>=50)	28.31				95% Gamma Adjusted UCL (use when n<50)		28.34
3499												
3500	**Estimates of Gamma Parameters using KM Estimates**											
3501					Mean (KM)	21.76				SD (KM)		148.9
3502					Variance (KM)	22175				SE of Mean (KM)		8.341
3503					k hat (KM)	0.0214				k star (KM)		0.0232
3504					nu hat (KM)	13.71				nu star (KM)		14.91
3505					theta hat (KM)	1019				theta star (KM)		936.7
3506					80% gamma percentile (KM)	0.0361				90% gamma percentile (KM)		5.781
3507					95% gamma percentile (KM)	62.83				99% gamma percentile (KM)		594.8
3508												
3509	**Gamma Kaplan-Meier (KM) Statistics**											
3510					Approximate Chi Square Value (14.91, α)	7.201				Adjusted Chi Square Value (14.91, β)		7.177
3511					95% Gamma Approximate KM-UCL (use when n>=50)	45.06				95% Gamma Adjusted KM-UCL (use when n<50)		45.21
3512												
3513	**Lognormal GOF Test on Detected Observations Only**											
3514					Shapiro Wilk Approximate Test Statistic	0.944				**Shapiro Wilk GOF Test**		
3515					5% Shapiro Wilk P Value	1.5194E-5				Detected Data Not Lognormal at 5% Significance Level		
3516					Lilliefors Test Statistic	0.0854				**Lilliefors GOF Test**		
3517					5% Lilliefors Critical Value	0.0753				Detected Data Not Lognormal at 5% Significance Level		
3518	**Detected Data Not Lognormal at 5% Significance Level**											
3519												
3520	**Lognormal ROS Statistics Using Imputed Non-Detects**											
3521					Mean in Original Scale	21.75				Mean in Log Scale		-3.227
3522					SD in Original Scale	149.1				SD in Log Scale		3.98
3523					95% t UCL (assumes normality of ROS data)	35.49				95% Percentile Bootstrap UCL		36.9
3524					95% BCA Bootstrap UCL	44.32				95% Bootstrap t UCL		58.74
3525					95% H-UCL (Log ROS)	366.8						
3526												
3527	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
3528					KM Mean (logged)	-2.008				KM Geo Mean		0.134
3529					KM SD (logged)	2.72				95% Critical H Value (KM-Log)		3.9
3530					KM Standard Error of Mean (logged)	0.165				95% H-UCL (KM -Log)		9.806
3531					KM SD (logged)	2.72				95% Critical H Value (KM-Log)		3.9
3532					KM Standard Error of Mean (logged)	0.165						
3533												
3534	**DL/2 Statistics**											
3535	**DL/2 Normal**						**DL/2 Log-Transformed**					
3536					Mean in Original Scale	21.76				Mean in Log Scale		-2.075

3537					SD in Original Scale	149.1					SD in Log Scale	2.758
3538					95% t UCL (Assumes normality)	35.49					95% H-Stat UCL	10.33
3539	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
3540												
3541	**Nonparametric Distribution Free UCL Statistics**											
3542	**Data do not follow a Discernible Distribution at 5% Significance Level**											
3543												
3544	**Suggested UCL to Use**											
3545					95% KM (Chebyshev) UCL	58.12						
3546												
3547	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3548	Recommendations are based upon data size, data distribution, and skewness.											
3549	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3550	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3551												
3552	**Val_AROCLOR_1260**											
3553												
3554	**General Statistics**											
3555					Total Number of Observations	321					Number of Distinct Observations	150
3556					Number of Detects	184					Number of Non-Detects	137
3557					Number of Distinct Detects	134					Number of Distinct Non-Detects	22
3558					Minimum Detect	0.0051					Minimum Non-Detect	0.035
3559					Maximum Detect	860					Maximum Non-Detect	0.071
3560					Variance Detects	6612					Percent Non-Detects	42.68%
3561					Mean Detects	19.75					SD Detects	81.31
3562					Median Detects	1.993					CV Detects	4.117
3563					Skewness Detects	7.725					Kurtosis Detects	69.73
3564					Mean of Logged Detects	0.378					SD of Logged Detects	2.417
3565												
3566	**Normal GOF Test on Detects Only**											
3567					Shapiro Wilk Test Statistic	0.269	**Normal GOF Test on Detected Observations Only**					
3568					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
3569					Lilliefors Test Statistic	0.407	**Lilliefors GOF Test**					
3570					5% Lilliefors Critical Value	0.0657	Detected Data Not Normal at 5% Significance Level					
3571	**Detected Data Not Normal at 5% Significance Level**											
3572												
3573	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
3574					KM Mean	11.33					KM Standard Error of Mean	3.479
3575					KM SD	62.17					95% KM (BCA) UCL	17.66
3576					95% KM (t) UCL	17.07					95% KM (Percentile Bootstrap) UCL	17.73
3577					95% KM (z) UCL	17.05					95% KM Bootstrap t UCL	23.03
3578					90% KM Chebyshev UCL	21.77					95% KM Chebyshev UCL	26.5
3579					97.5% KM Chebyshev UCL	33.06					99% KM Chebyshev UCL	45.95
3580												
3581	**Gamma GOF Tests on Detected Observations Only**											
3582					A-D Test Statistic	10.06	**Anderson-Darling GOF Test**					
3583					5% A-D Critical Value	0.885	Detected Data Not Gamma Distributed at 5% Significance Level					
3584					K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**					
3585					5% K-S Critical Value	0.0741	Detected Data Not Gamma Distributed at 5% Significance Level					
3586	**Detected Data Not Gamma Distributed at 5% Significance Level**											
3587												
3588	**Gamma Statistics on Detected Data Only**											

3589					k hat (MLE)	0.269				k star (bias corrected MLE)		0.269
3590					Theta hat (MLE)	73.32				Theta star (bias corrected MLE)		73.53
3591					nu hat (MLE)	99.13				nu star (bias corrected)		98.85
3592					Mean (detects)	19.75						
3593												
3594	**Gamma ROS Statistics using Imputed Non-Detects**											
3595	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
3596	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
3597	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
3598	This is especially true when the sample size is small.											
3599	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
3600					Minimum	0.0051				Mean		11.33
3601					Maximum	860				Median		0.069
3602					SD	62.26				CV		5.497
3603					k hat (MLE)	0.179				k star (bias corrected MLE)		0.18
3604					Theta hat (MLE)	63.19				Theta star (bias corrected MLE)		63.05
3605					nu hat (MLE)	115.1				nu star (bias corrected)		115.3
3606					Adjusted Level of Significance (β)	0.0493						
3607					Approximate Chi Square Value (115.33, α)	91.54				Adjusted Chi Square Value (115.33, β)		91.44
3608					95% Gamma Approximate UCL (use when n>=50)	14.27				95% Gamma Adjusted UCL (use when n<50)		14.28
3609												
3610	**Estimates of Gamma Parameters using KM Estimates**											
3611					Mean (KM)	11.33				SD (KM)		62.17
3612					Variance (KM)	3865				SE of Mean (KM)		3.479
3613					k hat (KM)	0.0332				k star (KM)		0.035
3614					nu hat (KM)	21.33				nu star (KM)		22.46
3615					theta hat (KM)	341.1				theta star (KM)		323.9
3616					80% gamma percentile (KM)	0.318				90% gamma percentile (KM)		9.468
3617					95% gamma percentile (KM)	49.83				99% gamma percentile (KM)		279.8
3618												
3619	**Gamma Kaplan-Meier (KM) Statistics**											
3620					Approximate Chi Square Value (22.46, α)	12.68				Adjusted Chi Square Value (22.46, β)		12.65
3621					95% Gamma Approximate KM-UCL (use when n>=50)	20.06				95% Gamma Adjusted KM-UCL (use when n<50)		20.12
3622												
3623	**Lognormal GOF Test on Detected Observations Only**											
3624					Shapiro Wilk Approximate Test Statistic	0.972				**Shapiro Wilk GOF Test**		
3625					5% Shapiro Wilk P Value	0.0492				Detected Data Not Lognormal at 5% Significance Level		
3626					Lilliefors Test Statistic	0.063				**Lilliefors GOF Test**		
3627					5% Lilliefors Critical Value	0.0657				Detected Data appear Lognormal at 5% Significance Level		
3628	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
3629												
3630	**Lognormal ROS Statistics Using Imputed Non-Detects**											
3631					Mean in Original Scale	11.33				Mean in Log Scale		-1.724
3632					SD in Original Scale	62.26				SD in Log Scale		3.218
3633					95% t UCL (assumes normality of ROS data)	17.06				95% Percentile Bootstrap UCL		17.52
3634					95% BCA Bootstrap UCL	20.44				95% Bootstrap t UCL		22.97
3635					95% H-UCL (Log ROS)	71.25						
3636												
3637	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
3638					KM Mean (logged)	-1.513				KM Geo Mean		0.22
3639					KM SD (logged)	2.885				95% Critical H Value (KM-Log)		4.104
3640					KM Standard Error of Mean (logged)	0.186				95% H-UCL (KM -Log)		27.4

	A	B	C	D	E	F	G	H	I	J	K	L
3641					KM SD (logged)	2.885				95% Critical H Value (KM-Log)		4.104
3642					KM Standard Error of Mean (logged)	0.186						
3643												
3644	**DL/2 Statistics**											
3645	**DL/2 Normal**						**DL/2 Log-Transformed**					
3646					Mean in Original Scale	11.33				Mean in Log Scale		-1.443
3647					SD in Original Scale	62.26				SD in Log Scale		2.796
3648					95% t UCL (Assumes normality)	17.06				95% H-Stat UCL		21.95
3649	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
3650												
3651	**Nonparametric Distribution Free UCL Statistics**											
3652	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
3653												
3654	**Suggested UCL to Use**											
3655					KM H-UCL	27.4						
3656												
3657	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
3658	Recommendations are based upon data size, data distribution, and skewness.											
3659	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
3660	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
3661												

1	**UCL Statistics for Data Sets with Non-Detects**										
2											
3	User Selected Options										
4	Date/Time of Computation	ProUCL 5.111/27/2017 6:59:56 PM									
5	From File	Soil540-Peck Soils=0-0.5_Formatted_Data_b.xls									
6	Full Precision	OFF									
7	Confidence Coefficient	95%									
8	Number of Bootstrap Operations	2000									
9											
10	**Val_BISMUTH_212**										
11											
12	**General Statistics**										
13	Total Number of Observations	31			Number of Distinct Observations	29					
14	Number of Detects	28			Number of Non-Detects	3					
15	Number of Distinct Detects	28			Number of Distinct Non-Detects	3					
16	Minimum Detect	0.583			Minimum Non-Detect	1.22					
17	Maximum Detect	1.6			Maximum Non-Detect	1.6					
18	Variance Detects	0.0886			Percent Non-Detects	9.677%					
19	Mean Detects	0.977			SD Detects	0.298					
20	Median Detects	0.925			CV Detects	0.305					
21	Skewness Detects	0.517			Kurtosis Detects	-0.905					
22	Mean of Logged Detects	-0.0671			SD of Logged Detects	0.301					
23											
24	**Normal GOF Test on Detects Only**										
25	Shapiro Wilk Test Statistic	0.929			**Shapiro Wilk GOF Test**						
26	5% Shapiro Wilk Critical Value	0.924			Detected Data appear Normal at 5% Significance Level						
27	Lilliefors Test Statistic	0.148			**Lilliefors GOF Test**						
28	5% Lilliefors Critical Value	0.164			Detected Data appear Normal at 5% Significance Level						
29	**Detected Data appear Normal at 5% Significance Level**										
30											
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
32	KM Mean	0.968			KM Standard Error of Mean	0.0543					
33	KM SD	0.288			95% KM (BCA) UCL	1.053					
34	95% KM (t) UCL	1.06			95% KM (Percentile Bootstrap) UCL	1.059					
35	95% KM (z) UCL	1.058			95% KM Bootstrap t UCL	1.069					
36	90% KM Chebyshev UCL	1.131			95% KM Chebyshev UCL	1.205					
37	97.5% KM Chebyshev UCL	1.308			99% KM Chebyshev UCL	1.509					
38											
39	**Gamma GOF Tests on Detected Observations Only**										
40	A-D Test Statistic	0.509			**Anderson-Darling GOF Test**						
41	5% A-D Critical Value	0.745			Detected data appear Gamma Distributed at 5% Significance Level						
42	K-S Test Statistic	0.143			**Kolmogorov-Smirnov GOF**						
43	5% K-S Critical Value	0.165			Detected data appear Gamma Distributed at 5% Significance Level						
44	**Detected data appear Gamma Distributed at 5% Significance Level**										
45											
46	**Gamma Statistics on Detected Data Only**										
47	k hat (MLE)	11.54			k star (bias corrected MLE)	10.33					
48	Theta hat (MLE)	0.0847			Theta star (bias corrected MLE)	0.0946					
49	nu hat (MLE)	646.2			nu star (bias corrected)	578.3					
50	Mean (detects)	0.977									
51											
52	**Gamma ROS Statistics using Imputed Non-Detects**										

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.583				Mean	0.968	
59					Maximum	1.6				Median	0.915	
60					SD	0.284				CV	0.293	
61					k hat (MLE)	12.61				k star (bias corrected MLE)	11.41	
62					Theta hat (MLE)	0.0768				Theta star (bias corrected MLE)	0.0849	
63					nu hat (MLE)	781.6				nu star (bias corrected)	707.3	
64					Adjusted Level of Significance (β)	0.0413						
65					Approximate Chi Square Value (707.27, α)	646.6				Adjusted Chi Square Value (707.27, β)	643.3	
66					95% Gamma Approximate UCL (use when n>=50)	1.059				95% Gamma Adjusted UCL (use when n<50)	1.064	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	0.968				SD (KM)	0.288	
70					Variance (KM)	0.083				SE of Mean (KM)	0.0543	
71					k hat (KM)	11.3				k star (KM)	10.23	
72					nu hat (KM)	700.5				nu star (KM)	634.1	
73					theta hat (KM)	0.0857				theta star (KM)	0.0947	
74					80% gamma percentile (KM)	1.21				90% gamma percentile (KM)	1.371	
75					95% gamma percentile (KM)	1.514				99% gamma percentile (KM)	1.808	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (634.06, α)	576.6				Adjusted Chi Square Value (634.06, β)	573.6	
79					95% Gamma Approximate KM-UCL (use when n>=50)	1.065				95% Gamma Adjusted KM-UCL (use when n<50)	1.07	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.949				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.924				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.132				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.164				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.967				Mean in Log Scale	-0.0738	
90					SD in Original Scale	0.284				SD in Log Scale	0.287	
91					95% t UCL (assumes normality of ROS data)	1.054				95% Percentile Bootstrap UCL	1.05	
92					95% BCA Bootstrap UCL	1.048				95% Bootstrap t UCL	1.06	
93					95% H-UCL (Log ROS)	1.063						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-0.0754				KM Geo Mean	0.927	
97					KM SD (logged)	0.293				95% Critical H Value (KM-Log)	1.789	
98					KM Standard Error of Mean (logged)	0.0555				95% H-UCL (KM -Log)	1.065	
99					KM SD (logged)	0.293				95% Critical H Value (KM-Log)	1.789	
100					KM Standard Error of Mean (logged)	0.0555						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	0.95				Mean in Log Scale	-0.0962	

105					SD in Original Scale	0.296					SD in Log Scale	0.302
106					95% t UCL (Assumes normality)	1.04					95% H-Stat UCL	1.049
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM (t) UCL	1.06						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120												
121	**Val_BISMUTH_214**											
122												
123	**General Statistics**											
124					Total Number of Observations	34					Number of Distinct Observations	34
125											Number of Missing Observations	0
126					Minimum	0.554					Mean	58.76
127					Maximum	550					Median	2.96
128					SD	137.4					Std. Error of Mean	23.56
129					Coefficient of Variation	2.338					Skewness	2.971
130												
131	**Normal GOF Test**											
132					Shapiro Wilk Test Statistic	0.481	**Shapiro Wilk GOF Test**					
133					5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level					
134					Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**					
135					5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level					
136	**Data Not Normal at 5% Significance Level**											
137												
138	**Assuming Normal Distribution**											
139	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
140					95% Student's-t UCL	98.62					95% Adjusted-CLT UCL (Chen-1995)	110.3
141											95% Modified-t UCL (Johnson-1978)	100.6
142												
143	**Gamma GOF Test**											
144					A-D Test Statistic	3.337	**Anderson-Darling Gamma GOF Test**					
145					5% A-D Critical Value	0.854	Data Not Gamma Distributed at 5% Significance Level					
146					K-S Test Statistic	0.271	**Kolmogorov-Smirnov Gamma GOF Test**					
147					5% K-S Critical Value	0.164	Data Not Gamma Distributed at 5% Significance Level					
148	**Data Not Gamma Distributed at 5% Significance Level**											
149												
150	**Gamma Statistics**											
151					k hat (MLE)	0.31					k star (bias corrected MLE)	0.302
152					Theta hat (MLE)	189.5					Theta star (bias corrected MLE)	194.3
153					nu hat (MLE)	21.09					nu star (bias corrected)	20.56
154					MLE Mean (bias corrected)	58.76					MLE Sd (bias corrected)	106.9
155											Approximate Chi Square Value (0.05)	11.27
156					Adjusted Level of Significance	0.0422					Adjusted Chi Square Value	10.92

157												
158	**Assuming Gamma Distribution**											
159	95% Approximate Gamma UCL (use when n>=50))					107.2	95% Adjusted Gamma UCL (use when n<50)					110.6
160												
161	**Lognormal GOF Test**											
162	Shapiro Wilk Test Statistic					0.856	**Shapiro Wilk Lognormal GOF Test**					
163	5% Shapiro Wilk Critical Value					0.933	Data Not Lognormal at 5% Significance Level					
164	Lilliefors Test Statistic					0.198	**Lilliefors Lognormal GOF Test**					
165	5% Lilliefors Critical Value					0.15	Data Not Lognormal at 5% Significance Level					
166	**Data Not Lognormal at 5% Significance Level**											
167												
168	**Lognormal Statistics**											
169	Minimum of Logged Data					-0.591	Mean of logged Data					1.862
170	Maximum of Logged Data					6.31	SD of logged Data					2.092
171												
172	**Assuming Lognormal Distribution**											
173	95% H-UCL					247.4	90% Chebyshev (MVUE) UCL					119.8
174	95% Chebyshev (MVUE) UCL					152.3	97.5% Chebyshev (MVUE) UCL					197.4
175	99% Chebyshev (MVUE) UCL					286.1						
176												
177	**Nonparametric Distribution Free UCL Statistics**											
178	**Data do not follow a Discernible Distribution (0.05)**											
179												
180	**Nonparametric Distribution Free UCLs**											
181	95% CLT UCL					97.5	95% Jackknife UCL					98.62
182	95% Standard Bootstrap UCL					96.71	95% Bootstrap-t UCL					154.4
183	95% Hall's Bootstrap UCL					128	95% Percentile Bootstrap UCL					99.22
184	95% BCA Bootstrap UCL					109						
185	90% Chebyshev(Mean, Sd) UCL					129.4	95% Chebyshev(Mean, Sd) UCL					161.4
186	97.5% Chebyshev(Mean, Sd) UCL					205.9	99% Chebyshev(Mean, Sd) UCL					293.1
187												
188	**Suggested UCL to Use**											
189	97.5% Chebyshev (Mean, Sd) UCL					205.9						
190												
191	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
192	Recommendations are based upon data size, data distribution, and skewness.											
193	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
194	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
195												
196	**Val_CESIUM_137**											
197												
198	**General Statistics**											
199	Total Number of Observations					32	Number of Distinct Observations					32
200	Number of Detects					31	Number of Non-Detects					1
201	Number of Distinct Detects					31	Number of Distinct Non-Detects					1
202	Minimum Detect					0.0215	Minimum Non-Detect					0.0325
203	Maximum Detect					0.247	Maximum Non-Detect					0.0325
204	Variance Detects					0.00307	Percent Non-Detects					3.125%
205	Mean Detects					0.0893	SD Detects					0.0554
206	Median Detects					0.0817	CV Detects					0.621
207	Skewness Detects					0.918	Kurtosis Detects					0.688
208	Mean of Logged Detects					-2.619	SD of Logged Detects					0.679

209												
210	**Normal GOF Test on Detects Only**											
211					Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**					
212					5% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 5% Significance Level					
213					Lilliefors Test Statistic	0.112	**Lilliefors GOF Test**					
214					5% Lilliefors Critical Value	0.156	Detected Data appear Normal at 5% Significance Level					
215	**Detected Data appear Approximate Normal at 5% Significance Level**											
216												
217	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
218					KM Mean	0.0873	KM Standard Error of Mean	0.00985				
219					KM SD	0.0548	95% KM (BCA) UCL	0.103				
220					95% KM (t) UCL	0.104	95% KM (Percentile Bootstrap) UCL	0.104				
221					95% KM (z) UCL	0.104	95% KM Bootstrap t UCL	0.106				
222					90% KM Chebyshev UCL	0.117	95% KM Chebyshev UCL	0.13				
223					97.5% KM Chebyshev UCL	0.149	99% KM Chebyshev UCL	0.185				
224												
225	**Gamma GOF Tests on Detected Observations Only**											
226					A-D Test Statistic	0.399	**Anderson-Darling GOF Test**					
227					5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level					
228					K-S Test Statistic	0.104	**Kolmogorov-Smirnov GOF**					
229					5% K-S Critical Value	0.159	Detected data appear Gamma Distributed at 5% Significance Level					
230	**Detected data appear Gamma Distributed at 5% Significance Level**											
231												
232	**Gamma Statistics on Detected Data Only**											
233					k hat (MLE)	2.611	k star (bias corrected MLE)	2.38				
234					Theta hat (MLE)	0.0342	Theta star (bias corrected MLE)	0.0375				
235					nu hat (MLE)	161.9	nu star (bias corrected)	147.5				
236					Mean (detects)	0.0893						
237												
238	**Gamma ROS Statistics using Imputed Non-Detects**											
239	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
240	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
241	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
242	This is especially true when the sample size is small.											
243	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
244					Minimum	0.0215	Mean	0.0873				
245					Maximum	0.247	Median	0.0815				
246					SD	0.0557	CV	0.638				
247					k hat (MLE)	2.487	k star (bias corrected MLE)	2.275				
248					Theta hat (MLE)	0.0351	Theta star (bias corrected MLE)	0.0384				
249					nu hat (MLE)	159.2	nu star (bias corrected)	145.6				
250					Adjusted Level of Significance (β)	0.0416						
251					Approximate Chi Square Value (145.60, α)	118.7	Adjusted Chi Square Value (145.60, β)	117.4				
252					95% Gamma Approximate UCL (use when n>=50)	0.107	95% Gamma Adjusted UCL (use when n<50)	0.108				
253												
254	**Estimates of Gamma Parameters using KM Estimates**											
255					Mean (KM)	0.0873	SD (KM)	0.0548				
256					Variance (KM)	0.003	SE of Mean (KM)	0.00985				
257					k hat (KM)	2.54	k star (KM)	2.322				
258					nu hat (KM)	162.5	nu star (KM)	148.6				
259					theta hat (KM)	0.0344	theta star (KM)	0.0376				
260					80% gamma percentile (KM)	0.128	90% gamma percentile (KM)	0.164				

261	95% gamma percentile (KM)					0.198	99% gamma percentile (KM)					0.272
262												
263	**Gamma Kaplan-Meier (KM) Statistics**											
264	Approximate Chi Square Value (148.63, α)					121.5	Adjusted Chi Square Value (148.63, β)					120.1
265	95% Gamma Approximate KM-UCL (use when n>=50)					0.107	95% Gamma Adjusted KM-UCL (use when n<50)					0.108
266												
267	**Lognormal GOF Test on Detected Observations Only**											
268	Shapiro Wilk Test Statistic					0.946	**Shapiro Wilk GOF Test**					
269	5% Shapiro Wilk Critical Value					0.929	Detected Data appear Lognormal at 5% Significance Level					
270	Lilliefors Test Statistic					0.147	**Lilliefors GOF Test**					
271	5% Lilliefors Critical Value					0.156	Detected Data appear Lognormal at 5% Significance Level					
272	**Detected Data appear Lognormal at 5% Significance Level**											
273												
274	**Lognormal ROS Statistics Using Imputed Non-Detects**											
275	Mean in Original Scale					0.0874	Mean in Log Scale					-2.648
276	SD in Original Scale					0.0556	SD in Log Scale					0.687
277	95% t UCL (assumes normality of ROS data)					0.104	95% Percentile Bootstrap UCL					0.104
278	95% BCA Bootstrap UCL					0.105	95% Bootstrap t UCL					0.106
279	95% H-UCL (Log ROS)					0.116						
280												
281	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
282	KM Mean (logged)					-2.652	KM Geo Mean					0.0705
283	KM SD (logged)					0.682	95% Critical H Value (KM-Log)					2.09
284	KM Standard Error of Mean (logged)					0.123	95% H-UCL (KM -Log)					0.115
285	KM SD (logged)					0.682	95% Critical H Value (KM-Log)					2.09
286	KM Standard Error of Mean (logged)					0.123						
287												
288	**DL/2 Statistics**											
289	**DL/2 Normal**						**DL/2 Log-Transformed**					
290	Mean in Original Scale					0.087	Mean in Log Scale					-2.666
291	SD in Original Scale					0.056	SD in Log Scale					0.719
292	95% t UCL (Assumes normality)					0.104	95% H-Stat UCL					0.118
293	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
297												
298	**Suggested UCL to Use**											
299	95% KM (t) UCL					0.104						
300												
301	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
302	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
303												
304	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
305	Recommendations are based upon data size, data distribution, and skewness.											
306	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
307	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
308												
309												
310	**Val_LEAD_210**											
311												
312	**General Statistics**											

313	Total Number of Observations					10	Number of Distinct Observations					10
314							Number of Missing Observations					0
315	Minimum					1.39	Mean					43.75
316	Maximum					353	Median					1.815
317	SD					109.7	Std. Error of Mean					34.69
318	Coefficient of Variation					2.508	Skewness					3.056
319												
320	**Normal GOF Test**											
321	Shapiro Wilk Test Statistic					0.455	**Shapiro Wilk GOF Test**					
322	5% Shapiro Wilk Critical Value					0.842	Data Not Normal at 5% Significance Level					
323	Lilliefors Test Statistic					0.394	**Lilliefors GOF Test**					
324	5% Lilliefors Critical Value					0.262	Data Not Normal at 5% Significance Level					
325	**Data Not Normal at 5% Significance Level**											
326												
327	**Assuming Normal Distribution**											
328	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
329	95% Student's-t UCL					107.3	95% Adjusted-CLT UCL (Chen-1995)					136.6
330							95% Modified-t UCL (Johnson-1978)					112.9
331												
332	**Gamma GOF Test**											
333	A-D Test Statistic					1.675	**Anderson-Darling Gamma GOF Test**					
334	5% A-D Critical Value					0.81	Data Not Gamma Distributed at 5% Significance Level					
335	K-S Test Statistic					0.405	**Kolmogorov-Smirnov Gamma GOF Test**					
336	5% K-S Critical Value					0.287	Data Not Gamma Distributed at 5% Significance Level					
337	**Data Not Gamma Distributed at 5% Significance Level**											
338												
339	**Gamma Statistics**											
340	k hat (MLE)					0.319	k star (bias corrected MLE)					0.29
341	Theta hat (MLE)					136.9	Theta star (bias corrected MLE)					150.7
342	nu hat (MLE)					6.39	nu star (bias corrected)					5.806
343	MLE Mean (bias corrected)					43.75	MLE Sd (bias corrected)					81.2
344							Approximate Chi Square Value (0.05)					1.542
345	Adjusted Level of Significance					0.0267	Adjusted Chi Square Value					1.193
346												
347	**Assuming Gamma Distribution**											
348	95% Approximate Gamma UCL (use when n>=50))					164.8	95% Adjusted Gamma UCL (use when n<50)					212.9
349												
350	**Lognormal GOF Test**											
351	Shapiro Wilk Test Statistic					0.717	**Shapiro Wilk Lognormal GOF Test**					
352	5% Shapiro Wilk Critical Value					0.842	Data Not Lognormal at 5% Significance Level					
353	Lilliefors Test Statistic					0.373	**Lilliefors Lognormal GOF Test**					
354	5% Lilliefors Critical Value					0.262	Data Not Lognormal at 5% Significance Level					
355	**Data Not Lognormal at 5% Significance Level**											
356												
357	**Lognormal Statistics**											
358	Minimum of Logged Data					0.329	Mean of logged Data					1.642
359	Maximum of Logged Data					5.866	SD of logged Data					1.968
360												
361	**Assuming Lognormal Distribution**											
362	95% H-UCL					1173	90% Chebyshev (MVUE) UCL					70.14
363	95% Chebyshev (MVUE) UCL					91.04	97.5% Chebyshev (MVUE) UCL					120.1
364	99% Chebyshev (MVUE) UCL					177						

365												
366	**Nonparametric Distribution Free UCL Statistics**											
367	**Data do not follow a Discernible Distribution (0.05)**											
368												
369	**Nonparametric Distribution Free UCLs**											
370					95% CLT UCL	100.8			95% Jackknife UCL	107.3		
371					95% Standard Bootstrap UCL	98.53			95% Bootstrap-t UCL	576.2		
372					95% Hall's Bootstrap UCL	588.6			95% Percentile Bootstrap UCL	109.6		
373					95% BCA Bootstrap UCL	147.3						
374					90% Chebyshev(Mean, Sd) UCL	147.8			95% Chebyshev(Mean, Sd) UCL	195		
375					97.5% Chebyshev(Mean, Sd) UCL	260.4			99% Chebyshev(Mean, Sd) UCL	388.9		
376												
377	**Suggested UCL to Use**											
378					99% Chebyshev (Mean, Sd) UCL	388.9						
379												
380	**Recommended UCL exceeds the maximum observation**											
381												
382	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
383	Recommendations are based upon data size, data distribution, and skewness.											
384	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
385	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
386												
387	**Val_LEAD_212**											
388												
389	**General Statistics**											
390					Total Number of Observations	34			Number of Distinct Observations	34		
391					Number of Detects	30			Number of Non-Detects	4		
392					Number of Distinct Detects	30			Number of Distinct Non-Detects	4		
393					Minimum Detect	0.327			Minimum Non-Detect	0.467		
394					Maximum Detect	1.42			Maximum Non-Detect	0.675		
395					Variance Detects	0.0879			Percent Non-Detects	11.76%		
396					Mean Detects	0.757			SD Detects	0.296		
397					Median Detects	0.691			CV Detects	0.392		
398					Skewness Detects	0.75			Kurtosis Detects	-0.28		
399					Mean of Logged Detects	-0.35			SD of Logged Detects	0.385		
400												
401	**Normal GOF Test on Detects Only**											
402					Shapiro Wilk Test Statistic	0.921			**Shapiro Wilk GOF Test**			
403					5% Shapiro Wilk Critical Value	0.927			Detected Data Not Normal at 5% Significance Level			
404					Lilliefors Test Statistic	0.153			**Lilliefors GOF Test**			
405					5% Lilliefors Critical Value	0.159			Detected Data appear Normal at 5% Significance Level			
406	**Detected Data appear Approximate Normal at 5% Significance Level**											
407												
408	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
409					KM Mean	0.723			KM Standard Error of Mean	0.0508		
410					KM SD	0.29			95% KM (BCA) UCL	0.8		
411					95% KM (t) UCL	0.809			95% KM (Percentile Bootstrap) UCL	0.806		
412					95% KM (z) UCL	0.807			95% KM Bootstrap t UCL	0.816		
413					90% KM Chebyshev UCL	0.876			95% KM Chebyshev UCL	0.945		
414					97.5% KM Chebyshev UCL	1.041			99% KM Chebyshev UCL	1.229		
415												
416	**Gamma GOF Tests on Detected Observations Only**											

	A	B	C	D	E	F	G	H	I	J	K	L
417					A-D Test Statistic	0.443	**Anderson-Darling GOF Test**					
418					5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level					
419					K-S Test Statistic	0.116	**Kolmogorov-Smirnov GOF**					
420					5% K-S Critical Value	0.16	Detected data appear Gamma Distributed at 5% Significance Level					
421	**Detected data appear Gamma Distributed at 5% Significance Level**											
422												
423	**Gamma Statistics on Detected Data Only**											
424					k hat (MLE)	7.135				k star (bias corrected MLE)		6.444
425					Theta hat (MLE)	0.106				Theta star (bias corrected MLE)		0.117
426					nu hat (MLE)	428.1				nu star (bias corrected)		386.6
427					Mean (detects)	0.757						
428												
429	**Gamma ROS Statistics using Imputed Non-Detects**											
430	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
431	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
432	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
433	This is especially true when the sample size is small.											
434	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
435					Minimum	0.327				Mean		0.722
436					Maximum	1.42				Median		0.673
437					SD	0.294				CV		0.408
438					k hat (MLE)	6.835				k star (bias corrected MLE)		6.251
439					Theta hat (MLE)	0.106				Theta star (bias corrected MLE)		0.116
440					nu hat (MLE)	464.8				nu star (bias corrected)		425.1
441					Adjusted Level of Significance (β)	0.0422						
442					Approximate Chi Square Value (425.08, α)	378.3				Adjusted Chi Square Value (425.08, β)		376.1
443					95% Gamma Approximate UCL (use when n>=50)	0.812				95% Gamma Adjusted UCL (use when n<50)		0.816
444												
445	**Estimates of Gamma Parameters using KM Estimates**											
446					Mean (KM)	0.723				SD (KM)		0.29
447					Variance (KM)	0.084				SE of Mean (KM)		0.0508
448					k hat (KM)	6.228				k star (KM)		5.698
449					nu hat (KM)	423.5				nu star (KM)		387.5
450					theta hat (KM)	0.116				theta star (KM)		0.127
451					80% gamma percentile (KM)	0.959				90% gamma percentile (KM)		1.129
452					95% gamma percentile (KM)	1.283				99% gamma percentile (KM)		1.607
453												
454	**Gamma Kaplan-Meier (KM) Statistics**											
455					Approximate Chi Square Value (387.46, α)	342.8				Adjusted Chi Square Value (387.46, β)		340.8
456					95% Gamma Approximate KM-UCL (use when n>=50)	0.818				95% Gamma Adjusted KM-UCL (use when n<50)		0.823
457												
458	**Lognormal GOF Test on Detected Observations Only**											
459					Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**					
460					5% Shapiro Wilk Critical Value	0.927	Detected Data appear Lognormal at 5% Significance Level					
461					Lilliefors Test Statistic	0.104	**Lilliefors GOF Test**					
462					5% Lilliefors Critical Value	0.159	Detected Data appear Lognormal at 5% Significance Level					
463	**Detected Data appear Lognormal at 5% Significance Level**											
464												
465	**Lognormal ROS Statistics Using Imputed Non-Detects**											
466					Mean in Original Scale	0.724				Mean in Log Scale		-0.396
467					SD in Original Scale	0.293				SD in Log Scale		0.383
468					95% t UCL (assumes normality of ROS data)	0.809				95% Percentile Bootstrap UCL		0.809

469					95% BCA Bootstrap UCL	0.822				95% Bootstrap t UCL		0.819
470					95% H-UCL (Log ROS)	0.82						
471												
472	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
473					KM Mean (logged)	-0.399				KM Geo Mean		0.671
474					KM SD (logged)	0.384				95% Critical H Value (KM-Log)		1.853
475					KM Standard Error of Mean (logged)	0.0677				95% H-UCL (KM -Log)		0.817
476					KM SD (logged)	0.384				95% Critical H Value (KM-Log)		1.853
477					KM Standard Error of Mean (logged)	0.0677						
478												
479	**DL/2 Statistics**											
480	**DL/2 Normal**						**DL/2 Log-Transformed**					
481					Mean in Original Scale	0.703				Mean in Log Scale		-0.451
482					SD in Original Scale	0.316				SD in Log Scale		0.46
483					95% t UCL (Assumes normality)	0.795				95% H-Stat UCL		0.825
484	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
485												
486	**Nonparametric Distribution Free UCL Statistics**											
487	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
488												
489	**Suggested UCL to Use**											
490					95% KM (t) UCL	0.809						
491												
492	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
493	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
494												
495	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
496	Recommendations are based upon data size, data distribution, and skewness.											
497	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
498	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
499												
500												
501	**Val_LEAD_214**											
502												
503	**General Statistics**											
504					Total Number of Observations	34				Number of Distinct Observations		33
505										Number of Missing Observations		0
506					Minimum	0.665				Mean		65.36
507					Maximum	596				Median		3.345
508					SD	150.6				Std. Error of Mean		25.83
509					Coefficient of Variation	2.304				Skewness		2.913
510												
511	**Normal GOF Test**											
512					Shapiro Wilk Test Statistic	0.487	**Shapiro Wilk GOF Test**					
513					5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level					
514					Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**					
515					5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level					
516	**Data Not Normal at 5% Significance Level**											
517												
518	**Assuming Normal Distribution**											
519	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
520					95% Student's-t UCL	109.1				95% Adjusted-CLT UCL (Chen-1995)		121.6

521							95% Modified-t UCL (Johnson-1978)					111.2
522												
523	**Gamma GOF Test**											
524					A-D Test Statistic	3.374	**Anderson-Darling Gamma GOF Test**					
525					5% A-D Critical Value	0.853	Data Not Gamma Distributed at 5% Significance Level					
526					K-S Test Statistic	0.276	**Kolmogorov-Smirnov Gamma GOF Test**					
527					5% K-S Critical Value	0.164	Data Not Gamma Distributed at 5% Significance Level					
528	**Data Not Gamma Distributed at 5% Significance Level**											
529												
530	**Gamma Statistics**											
531					k hat (MLE)	0.312	k star (bias corrected MLE)					0.304
532					Theta hat (MLE)	209.2	Theta star (bias corrected MLE)					214.7
533					nu hat (MLE)	21.24	nu star (bias corrected)					20.7
534					MLE Mean (bias corrected)	65.36	MLE Sd (bias corrected)					118.5
535							Approximate Chi Square Value (0.05)					11.37
536					Adjusted Level of Significance	0.0422	Adjusted Chi Square Value					11.03
537												
538	**Assuming Gamma Distribution**											
539					95% Approximate Gamma UCL (use when n>=50))	119	95% Adjusted Gamma UCL (use when n<50)					122.7
540												
541	**Lognormal GOF Test**											
542					Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk Lognormal GOF Test**					
543					5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level					
544					Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**					
545					5% Lilliefors Critical Value	0.15	Data Not Lognormal at 5% Significance Level					
546	**Data Not Lognormal at 5% Significance Level**											
547												
548	**Lognormal Statistics**											
549					Minimum of Logged Data	-0.408	Mean of logged Data					1.987
550					Maximum of Logged Data	6.39	SD of logged Data					2.085
551												
552	**Assuming Lognormal Distribution**											
553					95% H-UCL	274.2	90% Chebyshev (MVUE) UCL					133.9
554					95% Chebyshev (MVUE) UCL	170.1	97.5% Chebyshev (MVUE) UCL					220.5
555					99% Chebyshev (MVUE) UCL	319.3						
556												
557	**Nonparametric Distribution Free UCL Statistics**											
558	**Data do not follow a Discernible Distribution (0.05)**											
559												
560	**Nonparametric Distribution Free UCLs**											
561					95% CLT UCL	107.8	95% Jackknife UCL					109.1
562					95% Standard Bootstrap UCL	108	95% Bootstrap-t UCL					152
563					95% Hall's Bootstrap UCL	137.2	95% Percentile Bootstrap UCL					109.7
564					95% BCA Bootstrap UCL	123.8						
565					90% Chebyshev(Mean, Sd) UCL	142.8	95% Chebyshev(Mean, Sd) UCL					177.9
566					97.5% Chebyshev(Mean, Sd) UCL	226.6	99% Chebyshev(Mean, Sd) UCL					322.3
567												
568	**Suggested UCL to Use**											
569					97.5% Chebyshev (Mean, Sd) UCL	226.6						
570												
571	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
572	Recommendations are based upon data size, data distribution, and skewness.											

	A	B	C	D	E	F	G	H	I	J	K	L
573	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
574	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
575												
576												
577	**Val_POTASSIUM_40**											
578												
579	**General Statistics**											
580					Total Number of Observations	34			Number of Distinct Observations			33
581									Number of Missing Observations			0
582					Minimum	2.36			Mean			8.243
583					Maximum	17.7			Median			7.195
584					SD	4.063			Std. Error of Mean			0.697
585					Coefficient of Variation	0.493			Skewness			0.865
586												
587	**Normal GOF Test**											
588					Shapiro Wilk Test Statistic	0.914			**Shapiro Wilk GOF Test**			
589					5% Shapiro Wilk Critical Value	0.933			Data Not Normal at 5% Significance Level			
590					Lilliefors Test Statistic	0.149			**Lilliefors GOF Test**			
591					5% Lilliefors Critical Value	0.15			Data appear Normal at 5% Significance Level			
592	**Data appear Approximate Normal at 5% Significance Level**											
593												
594	**Assuming Normal Distribution**											
595					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
596					95% Student's-t UCL	9.423			95% Adjusted-CLT UCL (Chen-1995)			9.5
597									95% Modified-t UCL (Johnson-1978)			9.44
598												
599	**Gamma GOF Test**											
600					A-D Test Statistic	0.374			**Anderson-Darling Gamma GOF Test**			
601					5% A-D Critical Value	0.751			Detected data appear Gamma Distributed at 5% Significance Level			
602					K-S Test Statistic	0.0933			**Kolmogorov-Smirnov Gamma GOF Test**			
603					5% K-S Critical Value	0.152			Detected data appear Gamma Distributed at 5% Significance Level			
604	**Detected data appear Gamma Distributed at 5% Significance Level**											
605												
606	**Gamma Statistics**											
607					k hat (MLE)	4.401			k star (bias corrected MLE)			4.032
608					Theta hat (MLE)	1.873			Theta star (bias corrected MLE)			2.044
609					nu hat (MLE)	299.3			nu star (bias corrected)			274.2
610					MLE Mean (bias corrected)	8.243			MLE Sd (bias corrected)			4.105
611									Approximate Chi Square Value (0.05)			236.8
612					Adjusted Level of Significance	0.0422			Adjusted Chi Square Value			235.1
613												
614	**Assuming Gamma Distribution**											
615					95% Approximate Gamma UCL (use when n>=50))	9.543			95% Adjusted Gamma UCL (use when n<50)			9.613
616												
617	**Lognormal GOF Test**											
618					Shapiro Wilk Test Statistic	0.969			**Shapiro Wilk Lognormal GOF Test**			
619					5% Shapiro Wilk Critical Value	0.933			Data appear Lognormal at 5% Significance Level			
620					Lilliefors Test Statistic	0.11			**Lilliefors Lognormal GOF Test**			
621					5% Lilliefors Critical Value	0.15			Data appear Lognormal at 5% Significance Level			
622	**Data appear Lognormal at 5% Significance Level**											
623												
624	**Lognormal Statistics**											

625					Minimum of Logged Data	0.859				Mean of logged Data		1.991
626					Maximum of Logged Data	2.874				SD of logged Data		0.502
627												
628	**Assuming Lognormal Distribution**											
629					95% H-UCL	9.848				90% Chebyshev (MVUE) UCL		10.51
630					95% Chebyshev (MVUE) UCL	11.53				97.5% Chebyshev (MVUE) UCL		12.93
631					99% Chebyshev (MVUE) UCL	15.7						
632												
633	**Nonparametric Distribution Free UCL Statistics**											
634	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
635												
636	**Nonparametric Distribution Free UCLs**											
637					95% CLT UCL	9.389				95% Jackknife UCL		9.423
638					95% Standard Bootstrap UCL	9.36				95% Bootstrap-t UCL		9.483
639					95% Hall's Bootstrap UCL	9.533				95% Percentile Bootstrap UCL		9.416
640					95% BCA Bootstrap UCL	9.531						
641					90% Chebyshev(Mean, Sd) UCL	10.33				95% Chebyshev(Mean, Sd) UCL		11.28
642					97.5% Chebyshev(Mean, Sd) UCL	12.6				99% Chebyshev(Mean, Sd) UCL		15.18
643												
644	**Suggested UCL to Use**											
645					95% Student's-t UCL	9.423						
646												
647	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
648	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
649												
650	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
651	Recommendations are based upon data size, data distribution, and skewness.											
652	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
653	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
654												
655												
656	**Val_RADIUM_226**											
657												
658	**General Statistics**											
659					Total Number of Observations	8				Number of Distinct Observations		8
660										Number of Missing Observations		0
661					Minimum	1.16				Mean		1.919
662					Maximum	2.67				Median		1.9
663					SD	0.499				Std. Error of Mean		0.176
664					Coefficient of Variation	0.26				Skewness		-0.0381
665												
666	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
667	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
668	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
669	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
670												
671	**Normal GOF Test**											
672					Shapiro Wilk Test Statistic	0.985				**Shapiro Wilk GOF Test**		
673					5% Shapiro Wilk Critical Value	0.818				Data appear Normal at 5% Significance Level		
674					Lilliefors Test Statistic	0.118				**Lilliefors GOF Test**		
675					5% Lilliefors Critical Value	0.283				Data appear Normal at 5% Significance Level		
676	**Data appear Normal at 5% Significance Level**											

677												
678	**Assuming Normal Distribution**											
679	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
680				95% Student's-t UCL		2.253				95% Adjusted-CLT UCL (Chen-1995)		2.206
681										95% Modified-t UCL (Johnson-1978)		2.252
682												
683	**Gamma GOF Test**											
684				A-D Test Statistic		0.176	**Anderson-Darling Gamma GOF Test**					
685				5% A-D Critical Value		0.716	Detected data appear Gamma Distributed at 5% Significance Level					
686				K-S Test Statistic		0.141	**Kolmogorov-Smirnov Gamma GOF Test**					
687				5% K-S Critical Value		0.294	Detected data appear Gamma Distributed at 5% Significance Level					
688	**Detected data appear Gamma Distributed at 5% Significance Level**											
689												
690	**Gamma Statistics**											
691				k hat (MLE)		15.92				k star (bias corrected MLE)		10.04
692				Theta hat (MLE)		0.12				Theta star (bias corrected MLE)		0.191
693				nu hat (MLE)		254.8				nu star (bias corrected)		160.6
694				MLE Mean (bias corrected)		1.919				MLE Sd (bias corrected)		0.606
695										Approximate Chi Square Value (0.05)		132.3
696				Adjusted Level of Significance		0.0195				Adjusted Chi Square Value		125.8
697												
698	**Assuming Gamma Distribution**											
699				95% Approximate Gamma UCL (use when n>=50))		2.329				95% Adjusted Gamma UCL (use when n<50)		2.45
700												
701	**Lognormal GOF Test**											
702				Shapiro Wilk Test Statistic		0.967	**Shapiro Wilk Lognormal GOF Test**					
703				5% Shapiro Wilk Critical Value		0.818	Data appear Lognormal at 5% Significance Level					
704				Lilliefors Test Statistic		0.163	**Lilliefors Lognormal GOF Test**					
705				5% Lilliefors Critical Value		0.283	Data appear Lognormal at 5% Significance Level					
706	**Data appear Lognormal at 5% Significance Level**											
707												
708	**Lognormal Statistics**											
709				Minimum of Logged Data		0.148				Mean of logged Data		0.62
710				Maximum of Logged Data		0.982				SD of logged Data		0.275
711												
712	**Assuming Lognormal Distribution**											
713				95% H-UCL		2.383				90% Chebyshev (MVUE) UCL		2.483
714				95% Chebyshev (MVUE) UCL		2.738				97.5% Chebyshev (MVUE) UCL		3.092
715				99% Chebyshev (MVUE) UCL		3.786						
716												
717	**Nonparametric Distribution Free UCL Statistics**											
718	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
719												
720	**Nonparametric Distribution Free UCLs**											
721				95% CLT UCL		2.209				95% Jackknife UCL		2.253
722				95% Standard Bootstrap UCL		2.183				95% Bootstrap-t UCL		2.249
723				95% Hall's Bootstrap UCL		2.245				95% Percentile Bootstrap UCL		2.189
724				95% BCA Bootstrap UCL		2.166						
725				90% Chebyshev(Mean, Sd) UCL		2.448				95% Chebyshev(Mean, Sd) UCL		2.687
726				97.5% Chebyshev(Mean, Sd) UCL		3.02				99% Chebyshev(Mean, Sd) UCL		3.673
727												
728	**Suggested UCL to Use**											

729					95% Student's-t UCL	2.253						
730												
731	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
732	Recommendations are based upon data size, data distribution, and skewness.											
733	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
734	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
735												
736	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
737	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
738												
739	**Val_RADIUM_228**											
740												
741	**General Statistics**											
742					Total Number of Observations	35			Number of Distinct Observations	34		
743					Number of Detects	32			Number of Non-Detects	3		
744					Number of Distinct Detects	31			Number of Distinct Non-Detects	3		
745					Minimum Detect	0.387			Minimum Non-Detect	0.405		
746					Maximum Detect	1.44			Maximum Non-Detect	0.659		
747					Variance Detects	0.0809			Percent Non-Detects	8.571%		
748					Mean Detects	0.826			SD Detects	0.284		
749					Median Detects	0.759			CV Detects	0.344		
750					Skewness Detects	0.642			Kurtosis Detects	-0.494		
751					Mean of Logged Detects	-0.247			SD of Logged Detects	0.341		
752												
753	**Normal GOF Test on Detects Only**											
754					Shapiro Wilk Test Statistic	0.936			**Shapiro Wilk GOF Test**			
755					5% Shapiro Wilk Critical Value	0.93			Detected Data appear Normal at 5% Significance Level			
756					Lilliefors Test Statistic	0.143			**Lilliefors GOF Test**			
757					5% Lilliefors Critical Value	0.154			Detected Data appear Normal at 5% Significance Level			
758	**Detected Data appear Normal at 5% Significance Level**											
759												
760	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
761					KM Mean	0.794			KM Standard Error of Mean	0.0497		
762					KM SD	0.289			95% KM (BCA) UCL	0.878		
763					95% KM (t) UCL	0.878			95% KM (Percentile Bootstrap) UCL	0.876		
764					95% KM (z) UCL	0.876			95% KM Bootstrap t UCL	0.884		
765					90% KM Chebyshev UCL	0.943			95% KM Chebyshev UCL	1.011		
766					97.5% KM Chebyshev UCL	1.104			99% KM Chebyshev UCL	1.288		
767												
768	**Gamma GOF Tests on Detected Observations Only**											
769					A-D Test Statistic	0.354			**Anderson-Darling GOF Test**			
770					5% A-D Critical Value	0.747			Detected data appear Gamma Distributed at 5% Significance Level			
771					K-S Test Statistic	0.0999			**Kolmogorov-Smirnov GOF**			
772					5% K-S Critical Value	0.155			Detected data appear Gamma Distributed at 5% Significance Level			
773	**Detected data appear Gamma Distributed at 5% Significance Level**											
774												
775	**Gamma Statistics on Detected Data Only**											
776					k hat (MLE)	9.057			k star (bias corrected MLE)	8.229		
777					Theta hat (MLE)	0.0912			Theta star (bias corrected MLE)	0.1		
778					nu hat (MLE)	579.7			nu star (bias corrected)	526.6		
779					Mean (detects)	0.826						
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781	**Gamma ROS Statistics using Imputed Non-Detects**											
782	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
783	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
784	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
785	This is especially true when the sample size is small.											
786	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
787					Minimum	0.317				Mean		0.791
788					Maximum	1.44				Median		0.735
789					SD	0.297				CV		0.376
790					k hat (MLE)	7.383				k star (bias corrected MLE)		6.769
791					Theta hat (MLE)	0.107				Theta star (bias corrected MLE)		0.117
792					nu hat (MLE)	516.8				nu star (bias corrected)		473.8
793					Adjusted Level of Significance (β)	0.0425						
794					Approximate Chi Square Value (473.82, α)	424.3				Adjusted Chi Square Value (473.82, β)		422.1
795					95% Gamma Approximate UCL (use when n>=50)	0.883				95% Gamma Adjusted UCL (use when n<50)		0.887
796												
797	**Estimates of Gamma Parameters using KM Estimates**											
798					Mean (KM)	0.794				SD (KM)		0.289
799					Variance (KM)	0.0834				SE of Mean (KM)		0.0497
800					k hat (KM)	7.554				k star (KM)		6.926
801					nu hat (KM)	528.8				nu star (KM)		484.8
802					theta hat (KM)	0.105				theta star (KM)		0.115
803					80% gamma percentile (KM)	1.03				90% gamma percentile (KM)		1.197
804					95% gamma percentile (KM)	1.346				99% gamma percentile (KM)		1.658
805												
806	**Gamma Kaplan-Meier (KM) Statistics**											
807					Approximate Chi Square Value (484.82, α)	434.8				Adjusted Chi Square Value (484.82, β)		432.5
808					95% Gamma Approximate KM-UCL (use when n>=50)	0.885				95% Gamma Adjusted KM-UCL (use when n<50)		0.89
809												
810	**Lognormal GOF Test on Detected Observations Only**											
811					Shapiro Wilk Test Statistic	0.973				**Shapiro Wilk GOF Test**		
812					5% Shapiro Wilk Critical Value	0.93				Detected Data appear Lognormal at 5% Significance Level		
813					Lilliefors Test Statistic	0.0888				**Lilliefors GOF Test**		
814					5% Lilliefors Critical Value	0.154				Detected Data appear Lognormal at 5% Significance Level		
815	**Detected Data appear Lognormal at 5% Significance Level**											
816												
817	**Lognormal ROS Statistics Using Imputed Non-Detects**											
818					Mean in Original Scale	0.794				Mean in Log Scale		-0.296
819					SD in Original Scale	0.293				SD in Log Scale		0.366
820					95% t UCL (assumes normality of ROS data)	0.878				95% Percentile Bootstrap UCL		0.876
821					95% BCA Bootstrap UCL	0.879				95% Bootstrap t UCL		0.886
822					95% H-UCL (Log ROS)	0.893						
823												
824	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
825					KM Mean (logged)	-0.296				KM Geo Mean		0.744
826					KM SD (logged)	0.362				95% Critical H Value (KM-Log)		1.841
827					KM Standard Error of Mean (logged)	0.0625				95% H-UCL (KM -Log)		0.89
828					KM SD (logged)	0.362				95% Critical H Value (KM-Log)		1.841
829					KM Standard Error of Mean (logged)	0.0625						
830												
831	**DL/2 Statistics**											
832	**DL/2 Normal**									**DL/2 Log-Transformed**		

833					Mean in Original Scale	0.778					Mean in Log Scale	-0.341
834					SD in Original Scale	0.315					SD in Log Scale	0.455
835					95% t UCL (Assumes normality)	0.868					95% H-Stat UCL	0.915
836	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
837												
838	**Nonparametric Distribution Free UCL Statistics**											
839	**Detected Data appear Normal Distributed at 5% Significance Level**											
840												
841	**Suggested UCL to Use**											
842					95% KM (t) UCL	0.878						
843												
844	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
845	Recommendations are based upon data size, data distribution, and skewness.											
846	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
847	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
848												
849												
850	**Val_THALLIUM_208**											
851												
852	**General Statistics**											
853					Total Number of Observations	31					Number of Distinct Observations	30
854											Number of Missing Observations	0
855					Minimum	0.111					Mean	0.247
856					Maximum	0.435					Median	0.236
857					SD	0.0885					Std. Error of Mean	0.0159
858					Coefficient of Variation	0.358					Skewness	0.565
859												
860	**Normal GOF Test**											
861					Shapiro Wilk Test Statistic	0.936	**Shapiro Wilk GOF Test**					
862					5% Shapiro Wilk Critical Value	0.929	Data appear Normal at 5% Significance Level					
863					Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**					
864					5% Lilliefors Critical Value	0.156	Data appear Normal at 5% Significance Level					
865	**Data appear Normal at 5% Significance Level**											
866												
867	**Assuming Normal Distribution**											
868	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
869					95% Student's-t UCL	0.274					95% Adjusted-CLT UCL (Chen-1995)	0.275
870											95% Modified-t UCL (Johnson-1978)	0.274
871												
872	**Gamma GOF Test**											
873					A-D Test Statistic	0.4	**Anderson-Darling Gamma GOF Test**					
874					5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level					
875					K-S Test Statistic	0.108	**Kolmogorov-Smirnov Gamma GOF Test**					
876					5% K-S Critical Value	0.158	Detected data appear Gamma Distributed at 5% Significance Level					
877	**Detected data appear Gamma Distributed at 5% Significance Level**											
878												
879	**Gamma Statistics**											
880					k hat (MLE)	8.258					k star (bias corrected MLE)	7.481
881					Theta hat (MLE)	0.0299					Theta star (bias corrected MLE)	0.0331
882					nu hat (MLE)	512					nu star (bias corrected)	463.8
883					MLE Mean (bias corrected)	0.247					MLE Sd (bias corrected)	0.0904
884											Approximate Chi Square Value (0.05)	414.9

	A	B	C	D	E	F	G	H	I	J	K	L
885					Adjusted Level of Significance	0.0413				Adjusted Chi Square Value		412.3
886												
887					**Assuming Gamma Distribution**							
888					95% Approximate Gamma UCL (use when n>=50))	0.276				95% Adjusted Gamma UCL (use when n<50)		0.278
889												
890					**Lognormal GOF Test**							
891					Shapiro Wilk Test Statistic	0.965			**Shapiro Wilk Lognormal GOF Test**			
892					5% Shapiro Wilk Critical Value	0.929			Data appear Lognormal at 5% Significance Level			
893					Lilliefors Test Statistic	0.0925			**Lilliefors Lognormal GOF Test**			
894					5% Lilliefors Critical Value	0.156			Data appear Lognormal at 5% Significance Level			
895					**Data appear Lognormal at 5% Significance Level**							
896												
897					**Lognormal Statistics**							
898					Minimum of Logged Data	-2.198			Mean of logged Data			-1.459
899					Maximum of Logged Data	-0.832			SD of logged Data			0.359
900												
901					**Assuming Lognormal Distribution**							
902					95% H-UCL	0.279			90% Chebyshev (MVUE) UCL			0.296
903					95% Chebyshev (MVUE) UCL	0.318			97.5% Chebyshev (MVUE) UCL			0.349
904					99% Chebyshev (MVUE) UCL	0.41						
905												
906					**Nonparametric Distribution Free UCL Statistics**							
907					**Data appear to follow a Discernible Distribution at 5% Significance Level**							
908												
909					**Nonparametric Distribution Free UCLs**							
910					95% CLT UCL	0.273			95% Jackknife UCL			0.274
911					95% Standard Bootstrap UCL	0.273			95% Bootstrap-t UCL			0.276
912					95% Hall's Bootstrap UCL	0.273			95% Percentile Bootstrap UCL			0.274
913					95% BCA Bootstrap UCL	0.275						
914					90% Chebyshev(Mean, Sd) UCL	0.295			95% Chebyshev(Mean, Sd) UCL			0.317
915					97.5% Chebyshev(Mean, Sd) UCL	0.347			99% Chebyshev(Mean, Sd) UCL			0.405
916												
917					**Suggested UCL to Use**							
918					95% Student's-t UCL	0.274						
919												
920	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
921	Recommendations are based upon data size, data distribution, and skewness.											
922	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
923	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
924												
925	**Val_THORIUM_234**											
926												
927					**General Statistics**							
928					Total Number of Observations	16			Number of Distinct Observations			16
929					Number of Detects	8			Number of Non-Detects			8
930					Number of Distinct Detects	8			Number of Distinct Non-Detects			8
931					Minimum Detect	0.662			Minimum Non-Detect			1.04
932					Maximum Detect	1.29			Maximum Non-Detect			12
933					Variance Detects	0.0421			Percent Non-Detects			50%
934					Mean Detects	1.024			SD Detects			0.205
935					Median Detects	1.028			CV Detects			0.2
936					Skewness Detects	-0.514			Kurtosis Detects			-0.0493

	A	B	C	D	E	F	G	H	I	J	K	L
937					Mean of Logged Detects	0.00434				SD of Logged Detects		0.216
938												
939	**Normal GOF Test on Detects Only**											
940					Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**					
941					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level					
942					Lilliefors Test Statistic	0.117	**Lilliefors GOF Test**					
943					5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level					
944	**Detected Data appear Normal at 5% Significance Level**											
945												
946	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
947					KM Mean	1				KM Standard Error of Mean		0.0683
948					KM SD	0.189				95% KM (BCA) UCL		1.105
949					95% KM (t) UCL	1.12				95% KM (Percentile Bootstrap) UCL		1.104
950					95% KM (z) UCL	1.112				95% KM Bootstrap t UCL		1.109
951					90% KM Chebyshev UCL	1.205				95% KM Chebyshev UCL		1.298
952					97.5% KM Chebyshev UCL	1.427				99% KM Chebyshev UCL		1.68
953												
954	**Gamma GOF Tests on Detected Observations Only**											
955					A-D Test Statistic	0.234	**Anderson-Darling GOF Test**					
956					5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level					
957					K-S Test Statistic	0.143	**Kolmogorov-Smirnov GOF**					
958					5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level					
959	**Detected data appear Gamma Distributed at 5% Significance Level**											
960												
961	**Gamma Statistics on Detected Data Only**											
962					k hat (MLE)	25.97				k star (bias corrected MLE)		16.32
963					Theta hat (MLE)	0.0394				Theta star (bias corrected MLE)		0.0628
964					nu hat (MLE)	415.6				nu star (bias corrected)		261.1
965					Mean (detects)	1.024						
966												
967	**Gamma ROS Statistics using Imputed Non-Detects**											
968	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
969	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
970	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
971	This is especially true when the sample size is small.											
972	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
973					Minimum	0.662				Mean		0.994
974					Maximum	1.29				Median		0.985
975					SD	0.146				CV		0.147
976					k hat (MLE)	47.89				k star (bias corrected MLE)		38.95
977					Theta hat (MLE)	0.0208				Theta star (bias corrected MLE)		0.0255
978					nu hat (MLE)	1532				nu star (bias corrected)		1246
979					Adjusted Level of Significance (β)	0.0335						
980					Approximate Chi Square Value (N/A, α)	1165				Adjusted Chi Square Value (N/A, β)		1156
981					95% Gamma Approximate UCL (use when n>=50)	1.063				95% Gamma Adjusted UCL (use when n<50)		1.072
982												
983	**Estimates of Gamma Parameters using KM Estimates**											
984					Mean (KM)	1				SD (KM)		0.189
985					Variance (KM)	0.0356				SE of Mean (KM)		0.0683
986					k hat (KM)	28.12				k star (KM)		22.89
987					nu hat (KM)	899.8				nu star (KM)		732.4
988					theta hat (KM)	0.0356				theta star (KM)		0.0437

	A	B	C	D	E	F	G	H	I	J	K	L
989					80% gamma percentile (KM)	1.17				90% gamma percentile (KM)		1.276
990					95% gamma percentile (KM)	1.367				99% gamma percentile (KM)		1.549
991												
992					**Gamma Kaplan-Meier (KM) Statistics**							
993					Approximate Chi Square Value (732.39, α)	670.6				Adjusted Chi Square Value (732.39, β)		663.9
994					95% Gamma Approximate KM-UCL (use when n>=50)	1.092				95% Gamma Adjusted KM-UCL (use when n<50)		1.103
995												
996					**Lognormal GOF Test on Detected Observations Only**							
997					Shapiro Wilk Test Statistic	0.938			**Shapiro Wilk GOF Test**			
998					5% Shapiro Wilk Critical Value	0.818			Detected Data appear Lognormal at 5% Significance Level			
999					Lilliefors Test Statistic	0.154			**Lilliefors GOF Test**			
1000					5% Lilliefors Critical Value	0.283			Detected Data appear Lognormal at 5% Significance Level			
1001					**Detected Data appear Lognormal at 5% Significance Level**							
1002												
1003					**Lognormal ROS Statistics Using Imputed Non-Detects**							
1004					Mean in Original Scale	0.989				Mean in Log Scale		-0.0218
1005					SD in Original Scale	0.147				SD in Log Scale		0.153
1006					95% t UCL (assumes normality of ROS data)	1.053				95% Percentile Bootstrap UCL		1.045
1007					95% BCA Bootstrap UCL	1.051				95% Bootstrap t UCL		1.058
1008					95% H-UCL (Log ROS)	1.061						
1009												
1010					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
1011					KM Mean (logged)	-0.0192				KM Geo Mean		0.981
1012					KM SD (logged)	0.201				95% Critical H Value (KM-Log)		1.801
1013					KM Standard Error of Mean (logged)	0.074				95% H-UCL (KM -Log)		1.099
1014					KM SD (logged)	0.201				95% Critical H Value (KM-Log)		1.801
1015					KM Standard Error of Mean (logged)	0.074						
1016												
1017					**DL/2 Statistics**							
1018					**DL/2 Normal**				**DL/2 Log-Transformed**			
1019					Mean in Original Scale	1.241				Mean in Log Scale		-0.0104
1020					SD in Original Scale	1.304				SD in Log Scale		0.576
1021					95% t UCL (Assumes normality)	1.812				95% H-Stat UCL		1.605
1022					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
1023												
1024					**Nonparametric Distribution Free UCL Statistics**							
1025					**Detected Data appear Normal Distributed at 5% Significance Level**							
1026												
1027					**Suggested UCL to Use**							
1028					95% KM (t) UCL	1.12						
1029												
1030					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
1031					Recommendations are based upon data size, data distribution, and skewness.							
1032					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
1033					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
1034												

1	**UCL Statistics for Data Sets with Non-Detects**										
2											
3	User Selected Options										
4	Date/Time of Computation	ProUCL 5.111/28/2017 10:28:47 AM									
5	From File	Soil539-Peck_Soils=0-12_Formatted_Data_Rad.xls									
6	Full Precision	OFF									
7	Confidence Coefficient	95%									
8	Number of Bootstrap Operations	2000									
9											
10	**Val_BISMUTH_212**										
11											
12	**General Statistics**										
13	Total Number of Observations	39			Number of Distinct Observations	34					
14	Number of Detects	36			Number of Non-Detects	3					
15	Number of Distinct Detects	33			Number of Distinct Non-Detects	3					
16	Minimum Detect	0.566			Minimum Non-Detect	1.22					
17	Maximum Detect	1.6			Maximum Non-Detect	1.6					
18	Variance Detects	0.08			Percent Non-Detects	7.692%					
19	Mean Detects	0.971			SD Detects	0.283					
20	Median Detects	0.936			CV Detects	0.291					
21	Skewness Detects	0.442			Kurtosis Detects	-0.79					
22	Mean of Logged Detects	-0.0706			SD of Logged Detects	0.292					
23											
24	**Normal GOF Test on Detects Only**										
25	Shapiro Wilk Test Statistic	0.945			**Shapiro Wilk GOF Test**						
26	5% Shapiro Wilk Critical Value	0.935			Detected Data appear Normal at 5% Significance Level						
27	Lilliefors Test Statistic	0.121			**Lilliefors GOF Test**						
28	5% Lilliefors Critical Value	0.145			Detected Data appear Normal at 5% Significance Level						
29	**Detected Data appear Normal at 5% Significance Level**										
30											
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
32	KM Mean	0.965			KM Standard Error of Mean	0.046					
33	KM SD	0.276			95% KM (BCA) UCL	1.037					
34	95% KM (t) UCL	1.043			95% KM (Percentile Bootstrap) UCL	1.039					
35	95% KM (z) UCL	1.041			95% KM Bootstrap t UCL	1.048					
36	90% KM Chebyshev UCL	1.104			95% KM Chebyshev UCL	1.166					
37	97.5% KM Chebyshev UCL	1.253			99% KM Chebyshev UCL	1.423					
38											
39	**Gamma GOF Tests on Detected Observations Only**										
40	A-D Test Statistic	0.403			**Anderson-Darling GOF Test**						
41	5% A-D Critical Value	0.748			Detected data appear Gamma Distributed at 5% Significance Level						
42	K-S Test Statistic	0.114			**Kolmogorov-Smirnov GOF**						
43	5% K-S Critical Value	0.147			Detected data appear Gamma Distributed at 5% Significance Level						
44	**Detected data appear Gamma Distributed at 5% Significance Level**										
45											
46	**Gamma Statistics on Detected Data Only**										
47	k hat (MLE)	12.31			k star (bias corrected MLE)	11.3					
48	Theta hat (MLE)	0.0789			Theta star (bias corrected MLE)	0.0859					
49	nu hat (MLE)	886			nu star (bias corrected)	813.5					
50	Mean (detects)	0.971									
51											
52	**Gamma ROS Statistics using Imputed Non-Detects**										

	A	B	C	D	E	F	G	H	I	J	K	L
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.566				Mean	0.965	
59					Maximum	1.6				Median	0.929	
60					SD	0.272				CV	0.282	
61					k hat (MLE)	13.22				k star (bias corrected MLE)	12.22	
62					Theta hat (MLE)	0.073				Theta star (bias corrected MLE)	0.079	
63					nu hat (MLE)	1031				nu star (bias corrected)	953.4	
64					Adjusted Level of Significance (β)	0.0437						
65					Approximate Chi Square Value (953.38, α)	882.7				Adjusted Chi Square Value (953.38, β)	880	
66					95% Gamma Approximate UCL (use when n>=50)	1.042				95% Gamma Adjusted UCL (use when n<50)	1.046	
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	0.965				SD (KM)	0.276	
70					Variance (KM)	0.0762				SE of Mean (KM)	0.046	
71					k hat (KM)	12.24				k star (KM)	11.32	
72					nu hat (KM)	954.8				nu star (KM)	882.6	
73					theta hat (KM)	0.0789				theta star (KM)	0.0853	
74					80% gamma percentile (KM)	1.195				90% gamma percentile (KM)	1.347	
75					95% gamma percentile (KM)	1.481				99% gamma percentile (KM)	1.755	
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (882.65, α)	814.7				Adjusted Chi Square Value (882.65, β)	812.1	
79					95% Gamma Approximate KM-UCL (use when n>=50)	1.046				95% Gamma Adjusted KM-UCL (use when n<50)	1.049	
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.959				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.935				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.103				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.145				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.964				Mean in Log Scale	-0.0748	
90					SD in Original Scale	0.273				SD in Log Scale	0.281	
91					95% t UCL (assumes normality of ROS data)	1.038				95% Percentile Bootstrap UCL	1.035	
92					95% BCA Bootstrap UCL	1.043				95% Bootstrap t UCL	1.046	
93					95% H-UCL (Log ROS)	1.047						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-0.0758				KM Geo Mean	0.927	
97					KM SD (logged)	0.286				95% Critical H Value (KM-Log)	1.781	
98					KM Standard Error of Mean (logged)	0.0478				95% H-UCL (KM -Log)	1.049	
99					KM SD (logged)	0.286				95% Critical H Value (KM-Log)	1.781	
100					KM Standard Error of Mean (logged)	0.0478						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**						**DL/2 Log-Transformed**					
104					Mean in Original Scale	0.95				Mean in Log Scale	-0.0934	

105					SD in Original Scale	0.282					SD in Log Scale	0.293
106					95% t UCL (Assumes normality)	1.026					95% H-Stat UCL	1.035
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM (t) UCL	1.043						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120												
121	**Val_BISMUTH_214**											
122												
123	**General Statistics**											
124					Total Number of Observations	42					Number of Distinct Observations	42
125											Number of Missing Observations	0
126					Minimum	0.518					Mean	47.74
127					Maximum	550					Median	1.555
128					SD	125.4					Std. Error of Mean	19.34
129					Coefficient of Variation	2.626					Skewness	3.366
130												
131	**Normal GOF Test**											
132					Shapiro Wilk Test Statistic	0.428					**Shapiro Wilk GOF Test**	
133					5% Shapiro Wilk Critical Value	0.942					Data Not Normal at 5% Significance Level	
134					Lilliefors Test Statistic	0.38					**Lilliefors GOF Test**	
135					5% Lilliefors Critical Value	0.135					Data Not Normal at 5% Significance Level	
136	**Data Not Normal at 5% Significance Level**											
137												
138	**Assuming Normal Distribution**											
139	**95% Normal UCL**										**95% UCLs (Adjusted for Skewness)**	
140					95% Student's-t UCL	80.29					95% Adjusted-CLT UCL (Chen-1995)	90.29
141											95% Modified-t UCL (Johnson-1978)	81.97
142												
143	**Gamma GOF Test**											
144					A-D Test Statistic	5.261					**Anderson-Darling Gamma GOF Test**	
145					5% A-D Critical Value	0.864					Data Not Gamma Distributed at 5% Significance Level	
146					K-S Test Statistic	0.303					**Kolmogorov-Smirnov Gamma GOF Test**	
147					5% K-S Critical Value	0.148					Data Not Gamma Distributed at 5% Significance Level	
148	**Data Not Gamma Distributed at 5% Significance Level**											
149												
150	**Gamma Statistics**											
151					k hat (MLE)	0.291					k star (bias corrected MLE)	0.286
152					Theta hat (MLE)	164.2					Theta star (bias corrected MLE)	167
153					nu hat (MLE)	24.43					nu star (bias corrected)	24.02
154					MLE Mean (bias corrected)	47.74					MLE Sd (bias corrected)	89.29
155											Approximate Chi Square Value (0.05)	13.86
156					Adjusted Level of Significance	0.0443					Adjusted Chi Square Value	13.58

157												
158	**Assuming Gamma Distribution**											
159	95% Approximate Gamma UCL (use when n>=50))					82.72	95% Adjusted Gamma UCL (use when n<50)					84.4
160												
161	**Lognormal GOF Test**											
162	Shapiro Wilk Test Statistic					0.783	**Shapiro Wilk Lognormal GOF Test**					
163	5% Shapiro Wilk Critical Value					0.942	Data Not Lognormal at 5% Significance Level					
164	Lilliefors Test Statistic					0.217	**Lilliefors Lognormal GOF Test**					
165	5% Lilliefors Critical Value					0.135	Data Not Lognormal at 5% Significance Level					
166	**Data Not Lognormal at 5% Significance Level**											
167												
168	**Lognormal Statistics**											
169	Minimum of Logged Data					-0.658	Mean of logged Data					1.482
170	Maximum of Logged Data					6.31	SD of logged Data					2.043
171												
172	**Assuming Lognormal Distribution**											
173	95% H-UCL					116	90% Chebyshev (MVUE) UCL					72.9
174	95% Chebyshev (MVUE) UCL					91.89	97.5% Chebyshev (MVUE) UCL					118.3
175	99% Chebyshev (MVUE) UCL					170						
176												
177	**Nonparametric Distribution Free UCL Statistics**											
178	**Data do not follow a Discernible Distribution (0.05)**											
179												
180	**Nonparametric Distribution Free UCLs**											
181	95% CLT UCL					79.56	95% Jackknife UCL					80.29
182	95% Standard Bootstrap UCL					78.11	95% Bootstrap-t UCL					125.6
183	95% Hall's Bootstrap UCL					101.7	95% Percentile Bootstrap UCL					84.17
184	95% BCA Bootstrap UCL					88.62						
185	90% Chebyshev(Mean, Sd) UCL					105.8	95% Chebyshev(Mean, Sd) UCL					132.1
186	97.5% Chebyshev(Mean, Sd) UCL					168.5	99% Chebyshev(Mean, Sd) UCL					240.2
187												
188	**Suggested UCL to Use**											
189	97.5% Chebyshev (Mean, Sd) UCL					168.5						
190												
191	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
192	Recommendations are based upon data size, data distribution, and skewness.											
193	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
194	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
195												
196	**Val_CESIUM_137**											
197												
198	**General Statistics**											
199	Total Number of Observations					39	Number of Distinct Observations					39
200	Number of Detects					38	Number of Non-Detects					1
201	Number of Distinct Detects					38	Number of Distinct Non-Detects					1
202	Minimum Detect					0.0215	Minimum Non-Detect					0.0325
203	Maximum Detect					0.247	Maximum Non-Detect					0.0325
204	Variance Detects					0.00285	Percent Non-Detects					2.564%
205	Mean Detects					0.0812	SD Detects					0.0534
206	Median Detects					0.0744	CV Detects					0.658
207	Skewness Detects					1.152	Kurtosis Detects					1.188
208	Mean of Logged Detects					-2.719	SD of Logged Detects					0.664

209												
210	**Normal GOF Test on Detects Only**											
211					Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**					
212					5% Shapiro Wilk Critical Value	0.938	Detected Data Not Normal at 5% Significance Level					
213					Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**					
214					5% Lilliefors Critical Value	0.142	Detected Data appear Normal at 5% Significance Level					
215	**Detected Data appear Approximate Normal at 5% Significance Level**											
216												
217	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
218					KM Mean	0.0798	KM Standard Error of Mean	0.00855				
219					KM SD	0.0527	95% KM (BCA) UCL	0.0946				
220					95% KM (t) UCL	0.0942	95% KM (Percentile Bootstrap) UCL	0.0942				
221					95% KM (z) UCL	0.0938	95% KM Bootstrap t UCL	0.0967				
222					90% KM Chebyshev UCL	0.105	95% KM Chebyshev UCL	0.117				
223					97.5% KM Chebyshev UCL	0.133	99% KM Chebyshev UCL	0.165				
224												
225	**Gamma GOF Tests on Detected Observations Only**											
226					A-D Test Statistic	0.601	**Anderson-Darling GOF Test**					
227					5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level					
228					K-S Test Statistic	0.127	**Kolmogorov-Smirnov GOF**					
229					5% K-S Critical Value	0.145	Detected data appear Gamma Distributed at 5% Significance Level					
230	**Detected data appear Gamma Distributed at 5% Significance Level**											
231												
232	**Gamma Statistics on Detected Data Only**											
233					k hat (MLE)	2.56	k star (bias corrected MLE)	2.375				
234					Theta hat (MLE)	0.0317	Theta star (bias corrected MLE)	0.0342				
235					nu hat (MLE)	194.6	nu star (bias corrected)	180.5				
236					Mean (detects)	0.0812						
237												
238	**Gamma ROS Statistics using Imputed Non-Detects**											
239	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
240	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
241	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
242	This is especially true when the sample size is small.											
243	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
244					Minimum	0.0193	Mean	0.0796				
245					Maximum	0.247	Median	0.0736				
246					SD	0.0536	CV	0.673				
247					k hat (MLE)	2.431	k star (bias corrected MLE)	2.261				
248					Theta hat (MLE)	0.0327	Theta star (bias corrected MLE)	0.0352				
249					nu hat (MLE)	189.6	nu star (bias corrected)	176.3				
250					Adjusted Level of Significance (β)	0.0437						
251					Approximate Chi Square Value (176.35, α)	146.6	Adjusted Chi Square Value (176.35, β)	145.6				
252					95% Gamma Approximate UCL (use when n>=50)	0.0957	95% Gamma Adjusted UCL (use when n<50)	0.0964				
253												
254	**Estimates of Gamma Parameters using KM Estimates**											
255					Mean (KM)	0.0798	SD (KM)	0.0527				
256					Variance (KM)	0.00278	SE of Mean (KM)	0.00855				
257					k hat (KM)	2.291	k star (KM)	2.132				
258					nu hat (KM)	178.7	nu star (KM)	166.3				
259					theta hat (KM)	0.0348	theta star (KM)	0.0374				
260					80% gamma percentile (KM)	0.119	90% gamma percentile (KM)	0.153				

261	95% gamma percentile (KM)					0.185	99% gamma percentile (KM)					0.258
262												
263	**Gamma Kaplan-Meier (KM) Statistics**											
264	Approximate Chi Square Value (166.26, α)					137.4	Adjusted Chi Square Value (166.26, β)					136.4
265	95% Gamma Approximate KM-UCL (use when n>=50)					0.0965	95% Gamma Adjusted KM-UCL (use when n<50)					0.0972
266												
267	**Lognormal GOF Test on Detected Observations Only**											
268	Shapiro Wilk Test Statistic					0.95	**Shapiro Wilk GOF Test**					
269	5% Shapiro Wilk Critical Value					0.938	Detected Data appear Lognormal at 5% Significance Level					
270	Lilliefors Test Statistic					0.116	**Lilliefors GOF Test**					
271	5% Lilliefors Critical Value					0.142	Detected Data appear Lognormal at 5% Significance Level					
272	**Detected Data appear Lognormal at 5% Significance Level**											
273												
274	**Lognormal ROS Statistics Using Imputed Non-Detects**											
275	Mean in Original Scale					0.0798	Mean in Log Scale					-2.742
276	SD in Original Scale					0.0534	SD in Log Scale					0.672
277	95% t UCL (assumes normality of ROS data)					0.0942	95% Percentile Bootstrap UCL					0.0932
278	95% BCA Bootstrap UCL					0.0944	95% Bootstrap t UCL					0.0967
279	95% H-UCL (Log ROS)					0.101						
280												
281	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
282	KM Mean (logged)					-2.743	KM Geo Mean					0.0644
283	KM SD (logged)					0.663	95% Critical H Value (KM-Log)					2.053
284	KM Standard Error of Mean (logged)					0.108	95% H-UCL (KM -Log)					0.1
285	KM SD (logged)					0.663	95% Critical H Value (KM-Log)					2.053
286	KM Standard Error of Mean (logged)					0.108						
287												
288	**DL/2 Statistics**											
289	**DL/2 Normal**						**DL/2 Log-Transformed**					
290	Mean in Original Scale					0.0795	Mean in Log Scale					-2.755
291	SD in Original Scale					0.0537	SD in Log Scale					0.693
292	95% t UCL (Assumes normality)					0.094	95% H-Stat UCL					0.102
293	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
294												
295	**Nonparametric Distribution Free UCL Statistics**											
296	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
297												
298	**Suggested UCL to Use**											
299	95% KM (t) UCL					0.0942						
300												
301	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
302	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
303												
304	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
305	Recommendations are based upon data size, data distribution, and skewness.											
306	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
307	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
308												
309												
310	**Val_LEAD_210**											
311												
312	**General Statistics**											

313					Total Number of Observations	18					Number of Distinct Observations	18
314											Number of Missing Observations	0
315					Minimum	0.522					Mean	24.78
316					Maximum	353					Median	1.513
317					SD	82.75					Std. Error of Mean	19.5
318					Coefficient of Variation	3.339					Skewness	4.108
319												
320					**Normal GOF Test**							
321					Shapiro Wilk Test Statistic	0.324	**Shapiro Wilk GOF Test**					
322					5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level					
323					Lilliefors Test Statistic	0.441	**Lilliefors GOF Test**					
324					5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level					
325					**Data Not Normal at 5% Significance Level**							
326												
327					**Assuming Normal Distribution**							
328					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
329					95% Student's-t UCL	58.71	95% Adjusted-CLT UCL (Chen-1995)					77.04
330							95% Modified-t UCL (Johnson-1978)					61.86
331												
332					**Gamma GOF Test**							
333					A-D Test Statistic	3.73	**Anderson-Darling Gamma GOF Test**					
334					5% A-D Critical Value	0.843	Data Not Gamma Distributed at 5% Significance Level					
335					K-S Test Statistic	0.461	**Kolmogorov-Smirnov Gamma GOF Test**					
336					5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level					
337					**Data Not Gamma Distributed at 5% Significance Level**							
338												
339					**Gamma Statistics**							
340					k hat (MLE)	0.298	k star (bias corrected MLE)					0.286
341					Theta hat (MLE)	83.1	Theta star (bias corrected MLE)					86.78
342					nu hat (MLE)	10.74	nu star (bias corrected)					10.28
343					MLE Mean (bias corrected)	24.78	MLE Sd (bias corrected)					46.37
344							Approximate Chi Square Value (0.05)					4.117
345					Adjusted Level of Significance	0.0357	Adjusted Chi Square Value					3.749
346												
347					**Assuming Gamma Distribution**							
348					95% Approximate Gamma UCL (use when n>=50))	61.87	95% Adjusted Gamma UCL (use when n<50)					67.94
349												
350					**Lognormal GOF Test**							
351					Shapiro Wilk Test Statistic	0.715	**Shapiro Wilk Lognormal GOF Test**					
352					5% Shapiro Wilk Critical Value	0.897	Data Not Lognormal at 5% Significance Level					
353					Lilliefors Test Statistic	0.365	**Lilliefors Lognormal GOF Test**					
354					5% Lilliefors Critical Value	0.202	Data Not Lognormal at 5% Significance Level					
355					**Data Not Lognormal at 5% Significance Level**							
356												
357					**Lognormal Statistics**							
358					Minimum of Logged Data	-0.65	Mean of logged Data					0.895
359					Maximum of Logged Data	5.866	SD of logged Data					1.699
360												
361					**Assuming Lognormal Distribution**							
362					95% H-UCL	49.15	90% Chebyshev (MVUE) UCL					21.4
363					95% Chebyshev (MVUE) UCL	27.11	97.5% Chebyshev (MVUE) UCL					35.03
364					99% Chebyshev (MVUE) UCL	50.6						

	A	B	C	D	E	F	G	H	I	J	K	L
365												
366	**Nonparametric Distribution Free UCL Statistics**											
367	**Data do not follow a Discernible Distribution (0.05)**											
368												
369	**Nonparametric Distribution Free UCLs**											
370	95% CLT UCL					56.86	95% Jackknife UCL					58.71
371	95% Standard Bootstrap UCL					56.65	95% Bootstrap-t UCL					320.3
372	95% Hall's Bootstrap UCL					325.5	95% Percentile Bootstrap UCL					62.39
373	95% BCA Bootstrap UCL					84.84						
374	90% Chebyshev(Mean, Sd) UCL					83.29	95% Chebyshev(Mean, Sd) UCL					109.8
375	97.5% Chebyshev(Mean, Sd) UCL					146.6	99% Chebyshev(Mean, Sd) UCL					218.8
376												
377	**Suggested UCL to Use**											
378	99% Chebyshev (Mean, Sd) UCL					218.8						
379												
380	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
381	Recommendations are based upon data size, data distribution, and skewness.											
382	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
383	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
384												
385	**Val_LEAD_212**											
386												
387	**General Statistics**											
388	Total Number of Observations					42	Number of Distinct Observations					42
389	Number of Detects					38	Number of Non-Detects					4
390	Number of Distinct Detects					38	Number of Distinct Non-Detects					4
391	Minimum Detect					0.327	Minimum Non-Detect					0.467
392	Maximum Detect					1.42	Maximum Non-Detect					0.675
393	Variance Detects					0.0764	Percent Non-Detects					9.524%
394	Mean Detects					0.77	SD Detects					0.276
395	Median Detects					0.719	CV Detects					0.359
396	Skewness Detects					0.608	Kurtosis Detects					-0.279
397	Mean of Logged Detects					-0.324	SD of Logged Detects					0.361
398												
399	**Normal GOF Test on Detects Only**											
400	Shapiro Wilk Test Statistic					0.944	**Shapiro Wilk GOF Test**					
401	5% Shapiro Wilk Critical Value					0.938	Detected Data appear Normal at 5% Significance Level					
402	Lilliefors Test Statistic					0.118	**Lilliefors GOF Test**					
403	5% Lilliefors Critical Value					0.142	Detected Data appear Normal at 5% Significance Level					
404	**Detected Data appear Normal at 5% Significance Level**											
405												
406	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
407	KM Mean					0.742	KM Standard Error of Mean					0.043
408	KM SD					0.274	95% KM (BCA) UCL					0.815
409	95% KM (t) UCL					0.815	95% KM (Percentile Bootstrap) UCL					0.815
410	95% KM (z) UCL					0.813	95% KM Bootstrap t UCL					0.823
411	90% KM Chebyshev UCL					0.872	95% KM Chebyshev UCL					0.93
412	97.5% KM Chebyshev UCL					1.011	99% KM Chebyshev UCL					1.171
413												
414	**Gamma GOF Tests on Detected Observations Only**											
415	A-D Test Statistic					0.348	**Anderson-Darling GOF Test**					
416	5% A-D Critical Value					0.749	Detected data appear Gamma Distributed at 5% Significance Level					

417					K-S Test Statistic	0.112	**Kolmogorov-Smirnov GOF**					
418					5% K-S Critical Value	0.143	Detected data appear Gamma Distributed at 5% Significance Level					
419	**Detected data appear Gamma Distributed at 5% Significance Level**											
420												
421	**Gamma Statistics on Detected Data Only**											
422					k hat (MLE)	8.148				k star (bias corrected MLE)		7.523
423					Theta hat (MLE)	0.0945				Theta star (bias corrected MLE)		0.102
424					nu hat (MLE)	619.3				nu star (bias corrected)		571.7
425					Mean (detects)	0.77						
426												
427	**Gamma ROS Statistics using Imputed Non-Detects**											
428	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
429	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
430	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
431	This is especially true when the sample size is small.											
432	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
433					Minimum	0.327				Mean		0.743
434					Maximum	1.42				Median		0.691
435					SD	0.277				CV		0.373
436					k hat (MLE)	7.773				k star (bias corrected MLE)		7.234
437					Theta hat (MLE)	0.0955				Theta star (bias corrected MLE)		0.103
438					nu hat (MLE)	653				nu star (bias corrected)		607.7
439					Adjusted Level of Significance (β)	0.0443						
440					Approximate Chi Square Value (607.66, α)	551.5				Adjusted Chi Square Value (607.66, β)		549.6
441					95% Gamma Approximate UCL (use when n>=50)	0.818				95% Gamma Adjusted UCL (use when n<50)		0.821
442												
443	**Estimates of Gamma Parameters using KM Estimates**											
444					Mean (KM)	0.742				SD (KM)		0.274
445					Variance (KM)	0.0752				SE of Mean (KM)		0.043
446					k hat (KM)	7.336				k star (KM)		6.827
447					nu hat (KM)	616.2				nu star (KM)		573.5
448					theta hat (KM)	0.101				theta star (KM)		0.109
449					80% gamma percentile (KM)	0.965				90% gamma percentile (KM)		1.122
450					95% gamma percentile (KM)	1.263				99% gamma percentile (KM)		1.557
451												
452	**Gamma Kaplan-Meier (KM) Statistics**											
453					Approximate Chi Square Value (573.50, α)	519				Adjusted Chi Square Value (573.50, β)		517.1
454					95% Gamma Approximate KM-UCL (use when n>=50)	0.821				95% Gamma Adjusted KM-UCL (use when n<50)		0.823
455												
456	**Lognormal GOF Test on Detected Observations Only**											
457					Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**					
458					5% Shapiro Wilk Critical Value	0.938	Detected Data appear Lognormal at 5% Significance Level					
459					Lilliefors Test Statistic	0.101	**Lilliefors GOF Test**					
460					5% Lilliefors Critical Value	0.142	Detected Data appear Lognormal at 5% Significance Level					
461	**Detected Data appear Lognormal at 5% Significance Level**											
462												
463	**Lognormal ROS Statistics Using Imputed Non-Detects**											
464					Mean in Original Scale	0.744				Mean in Log Scale		-0.361
465					SD in Original Scale	0.276				SD in Log Scale		0.363
466					95% t UCL (assumes normality of ROS data)	0.815				95% Percentile Bootstrap UCL		0.812
467					95% BCA Bootstrap UCL	0.818				95% Bootstrap t UCL		0.819
468					95% H-UCL (Log ROS)	0.825						

469												
470	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
471					KM Mean (logged)	-0.364			KM Geo Mean	0.695		
472					KM SD (logged)	0.365			95% Critical H Value (KM-Log)	1.812		
473					KM Standard Error of Mean (logged)	0.0577			95% H-UCL (KM -Log)	0.823		
474					KM SD (logged)	0.365			95% Critical H Value (KM-Log)	1.812		
475					KM Standard Error of Mean (logged)	0.0577						
476												
477	**DL/2 Statistics**											
478				**DL/2 Normal**				**DL/2 Log-Transformed**				
479					Mean in Original Scale	0.726			Mean in Log Scale	-0.408		
480					SD in Original Scale	0.297			SD in Log Scale	0.435		
481					95% t UCL (Assumes normality)	0.803			95% H-Stat UCL	0.829		
482	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
483												
484	**Nonparametric Distribution Free UCL Statistics**											
485	**Detected Data appear Normal Distributed at 5% Significance Level**											
486												
487	**Suggested UCL to Use**											
488					95% KM (t) UCL	0.815						
489												
490	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
491	Recommendations are based upon data size, data distribution, and skewness.											
492	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
493	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
494												
495												
496	**Val_LEAD_214**											
497												
498	**General Statistics**											
499					Total Number of Observations	42			Number of Distinct Observations	40		
500									Number of Missing Observations	0		
501					Minimum	0.591			Mean	53.12		
502					Maximum	596			Median	1.788		
503					SD	137.5			Std. Error of Mean	21.22		
504					Coefficient of Variation	2.588			Skewness	3.304		
505												
506	**Normal GOF Test**											
507					Shapiro Wilk Test Statistic	0.434			**Shapiro Wilk GOF Test**			
508					5% Shapiro Wilk Critical Value	0.942			Data Not Normal at 5% Significance Level			
509					Lilliefors Test Statistic	0.378			**Lilliefors GOF Test**			
510					5% Lilliefors Critical Value	0.135			Data Not Normal at 5% Significance Level			
511	**Data Not Normal at 5% Significance Level**											
512												
513	**Assuming Normal Distribution**											
514				**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**				
515					95% Student's-t UCL	88.82			95% Adjusted-CLT UCL (Chen-1995)	99.57		
516									95% Modified-t UCL (Johnson-1978)	90.62		
517												
518	**Gamma GOF Test**											
519					A-D Test Statistic	5.316			**Anderson-Darling Gamma GOF Test**			
520					5% A-D Critical Value	0.863			Data Not Gamma Distributed at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
521					K-S Test Statistic	0.308	**Kolmogorov-Smirnov Gamma GOF Test**					
522					5% K-S Critical Value	0.148	Data Not Gamma Distributed at 5% Significance Level					
523	**Data Not Gamma Distributed at 5% Significance Level**											
524												
525	**Gamma Statistics**											
526					k hat (MLE)	0.293				k star (bias corrected MLE)		0.288
527					Theta hat (MLE)	181.1				Theta star (bias corrected MLE)		184.3
528					nu hat (MLE)	24.64				nu star (bias corrected)		24.21
529					MLE Mean (bias corrected)	53.12				MLE Sd (bias corrected)		98.94
530										Approximate Chi Square Value (0.05)		14.01
531					Adjusted Level of Significance	0.0443				Adjusted Chi Square Value		13.73
532												
533	**Assuming Gamma Distribution**											
534			95% Approximate Gamma UCL (use when n>=50))			91.8				95% Adjusted Gamma UCL (use when n<50)		93.65
535												
536	**Lognormal GOF Test**											
537					Shapiro Wilk Test Statistic	0.779	**Shapiro Wilk Lognormal GOF Test**					
538					5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level					
539					Lilliefors Test Statistic	0.216	**Lilliefors Lognormal GOF Test**					
540					5% Lilliefors Critical Value	0.135	Data Not Lognormal at 5% Significance Level					
541	**Data Not Lognormal at 5% Significance Level**											
542												
543	**Lognormal Statistics**											
544					Minimum of Logged Data	-0.527				Mean of logged Data		1.613
545					Maximum of Logged Data	6.39				SD of logged Data		2.034
546												
547	**Assuming Lognormal Distribution**											
548					95% H-UCL	128.4				90% Chebyshev (MVUE) UCL		81.34
549					95% Chebyshev (MVUE) UCL	102.5				97.5% Chebyshev (MVUE) UCL		131.8
550					99% Chebyshev (MVUE) UCL	189.4						
551												
552	**Nonparametric Distribution Free UCL Statistics**											
553	**Data do not follow a Discernible Distribution (0.05)**											
554												
555	**Nonparametric Distribution Free UCLs**											
556					95% CLT UCL	88.01				95% Jackknife UCL		88.82
557					95% Standard Bootstrap UCL	88.21				95% Bootstrap-t UCL		132.4
558					95% Hall's Bootstrap UCL	111.9				95% Percentile Bootstrap UCL		90.88
559					95% BCA Bootstrap UCL	102.5						
560					90% Chebyshev(Mean, Sd) UCL	116.8				95% Chebyshev(Mean, Sd) UCL		145.6
561					97.5% Chebyshev(Mean, Sd) UCL	185.6				99% Chebyshev(Mean, Sd) UCL		264.2
562												
563	**Suggested UCL to Use**											
564					97.5% Chebyshev (Mean, Sd) UCL	185.6						
565												
566	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
567	Recommendations are based upon data size, data distribution, and skewness.											
568	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
569	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
570												
571												
572	**Val_POTASSIUM_40**											

	A	B	C	D	E	F	G	H	I	J	K	L
573												
574	**General Statistics**											
575					Total Number of Observations	42				Number of Distinct Observations		39
576										Number of Missing Observations		0
577					Minimum	2.36				Mean		8.072
578					Maximum	17.7				Median		7.26
579					SD	3.74				Std. Error of Mean		0.577
580					Coefficient of Variation	0.463				Skewness		1.007
581												
582	**Normal GOF Test**											
583					Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**					
584					5% Shapiro Wilk Critical Value	0.942	Data Not Normal at 5% Significance Level					
585					Lilliefors Test Statistic	0.16	**Lilliefors GOF Test**					
586					5% Lilliefors Critical Value	0.135	Data Not Normal at 5% Significance Level					
587	**Data Not Normal at 5% Significance Level**											
588												
589	**Assuming Normal Distribution**											
590	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
591					95% Student's-t UCL	9.043				95% Adjusted-CLT UCL (Chen-1995)		9.117
592										95% Modified-t UCL (Johnson-1978)		9.058
593												
594	**Gamma GOF Test**											
595					A-D Test Statistic	0.49	**Anderson-Darling Gamma GOF Test**					
596					5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level					
597					K-S Test Statistic	0.103	**Kolmogorov-Smirnov Gamma GOF Test**					
598					5% K-S Critical Value	0.137	Detected data appear Gamma Distributed at 5% Significance Level					
599	**Detected data appear Gamma Distributed at 5% Significance Level**											
600												
601	**Gamma Statistics**											
602					k hat (MLE)	5.095				k star (bias corrected MLE)		4.747
603					Theta hat (MLE)	1.584				Theta star (bias corrected MLE)		1.7
604					nu hat (MLE)	428				nu star (bias corrected)		398.7
605					MLE Mean (bias corrected)	8.072				MLE Sd (bias corrected)		3.705
606										Approximate Chi Square Value (0.05)		353.4
607					Adjusted Level of Significance	0.0443				Adjusted Chi Square Value		351.9
608												
609	**Assuming Gamma Distribution**											
610					95% Approximate Gamma UCL (use when n>=50)	9.106				95% Adjusted Gamma UCL (use when n<50)		9.145
611												
612	**Lognormal GOF Test**											
613					Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**					
614					5% Shapiro Wilk Critical Value	0.942	Data Not Lognormal at 5% Significance Level					
615					Lilliefors Test Statistic	0.099	**Lilliefors Lognormal GOF Test**					
616					5% Lilliefors Critical Value	0.135	Data appear Lognormal at 5% Significance Level					
617	**Data appear Approximate Lognormal at 5% Significance Level**											
618												
619	**Lognormal Statistics**											
620					Minimum of Logged Data	0.859				Mean of logged Data		1.987
621					Maximum of Logged Data	2.874				SD of logged Data		0.461
622												
623	**Assuming Lognormal Distribution**											
624					95% H-UCL	9.285				90% Chebyshev (MVUE) UCL		9.891

625					95% Chebyshev (MVUE) UCL	10.71				97.5% Chebyshev (MVUE) UCL		11.84
626					99% Chebyshev (MVUE) UCL	14.06						
627												
628	**Nonparametric Distribution Free UCL Statistics**											
629	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
630												
631	**Nonparametric Distribution Free UCLs**											
632					95% CLT UCL	9.021				95% Jackknife UCL		9.043
633					95% Standard Bootstrap UCL	9.012				95% Bootstrap-t UCL		9.23
634					95% Hall's Bootstrap UCL	9.142				95% Percentile Bootstrap UCL		9.013
635					95% BCA Bootstrap UCL	9.088						
636					90% Chebyshev(Mean, Sd) UCL	9.803				95% Chebyshev(Mean, Sd) UCL		10.59
637					97.5% Chebyshev(Mean, Sd) UCL	11.68				99% Chebyshev(Mean, Sd) UCL		13.81
638												
639	**Suggested UCL to Use**											
640					95% Adjusted Gamma UCL	9.145						
641												
642	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
643	Recommendations are based upon data size, data distribution, and skewness.											
644	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
645	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
646												
647												
648	**Val_RADIUM_226**											
649												
650	**General Statistics**											
651					Total Number of Observations	20				Number of Distinct Observations		19
652										Number of Missing Observations		0
653					Minimum	1.16				Mean		8.331
654					Maximum	124				Median		1.805
655					SD	27.29				Std. Error of Mean		6.102
656					Coefficient of Variation	3.276				Skewness		4.439
657												
658	**Normal GOF Test**											
659					Shapiro Wilk Test Statistic	0.273				**Shapiro Wilk GOF Test**		
660					5% Shapiro Wilk Critical Value	0.905				Data Not Normal at 5% Significance Level		
661					Lilliefors Test Statistic	0.478				**Lilliefors GOF Test**		
662					5% Lilliefors Critical Value	0.192				Data Not Normal at 5% Significance Level		
663	**Data Not Normal at 5% Significance Level**											
664												
665	**Assuming Normal Distribution**											
666					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
667					95% Student's-t UCL	18.88				95% Adjusted-CLT UCL (Chen-1995)		24.84
668										95% Modified-t UCL (Johnson-1978)		19.89
669												
670	**Gamma GOF Test**											
671					A-D Test Statistic	4.932				**Anderson-Darling Gamma GOF Test**		
672					5% A-D Critical Value	0.802				Data Not Gamma Distributed at 5% Significance Level		
673					K-S Test Statistic	0.454				**Kolmogorov-Smirnov Gamma GOF Test**		
674					5% K-S Critical Value	0.205				Data Not Gamma Distributed at 5% Significance Level		
675	**Data Not Gamma Distributed at 5% Significance Level**											
676												

	A	B	C	D	E	F	G	H	I	J	K	L
677	**Gamma Statistics**											
678					k hat (MLE)	0.502				k star (bias corrected MLE)		0.46
679					Theta hat (MLE)	16.59				Theta star (bias corrected MLE)		18.11
680					nu hat (MLE)	20.09				nu star (bias corrected)		18.41
681					MLE Mean (bias corrected)	8.331				MLE Sd (bias corrected)		12.28
682										Approximate Chi Square Value (0.05)		9.685
683					Adjusted Level of Significance	0.038				Adjusted Chi Square Value		9.186
684												
685	**Assuming Gamma Distribution**											
686			95% Approximate Gamma UCL (use when n>=50))			15.83				95% Adjusted Gamma UCL (use when n<50)		16.69
687												
688	**Lognormal GOF Test**											
689					Shapiro Wilk Test Statistic	0.597	**Shapiro Wilk Lognormal GOF Test**					
690					5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level					
691					Lilliefors Test Statistic	0.317	**Lilliefors Lognormal GOF Test**					
692					5% Lilliefors Critical Value	0.192	Data Not Lognormal at 5% Significance Level					
693	**Data Not Lognormal at 5% Significance Level**											
694												
695	**Lognormal Statistics**											
696					Minimum of Logged Data	0.148				Mean of logged Data		0.856
697					Maximum of Logged Data	4.82				SD of logged Data		1.05
698												
699	**Assuming Lognormal Distribution**											
700					95% H-UCL	7.844				90% Chebyshev (MVUE) UCL		7.043
701					95% Chebyshev (MVUE) UCL	8.456				97.5% Chebyshev (MVUE) UCL		10.42
702					99% Chebyshev (MVUE) UCL	14.27						
703												
704	**Nonparametric Distribution Free UCL Statistics**											
705	**Data do not follow a Discernible Distribution (0.05)**											
706												
707	**Nonparametric Distribution Free UCLs**											
708					95% CLT UCL	18.37				95% Jackknife UCL		18.88
709					95% Standard Bootstrap UCL	18.2				95% Bootstrap-t UCL		326.8
710					95% Hall's Bootstrap UCL	96.12				95% Percentile Bootstrap UCL		20.37
711					95% BCA Bootstrap UCL	27.44						
712					90% Chebyshev(Mean, Sd) UCL	26.64				95% Chebyshev(Mean, Sd) UCL		34.93
713					97.5% Chebyshev(Mean, Sd) UCL	46.44				99% Chebyshev(Mean, Sd) UCL		69.04
714												
715	**Suggested UCL to Use**											
716					95% Chebyshev (Mean, Sd) UCL	34.93						
717												
718	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
719	Recommendations are based upon data size, data distribution, and skewness.											
720	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
721	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
722												
723	**Val_RADIUM_228**											
724												
725	**General Statistics**											
726					Total Number of Observations	47				Number of Distinct Observations		45
727					Number of Detects	42				Number of Non-Detects		5
728					Number of Distinct Detects	41				Number of Distinct Non-Detects		5

729					Minimum Detect	0.387					Minimum Non-Detect	0.405
730					Maximum Detect	1.44					Maximum Non-Detect	1.32
731					Variance Detects	0.071					Percent Non-Detects	10.64%
732					Mean Detects	0.811					SD Detects	0.266
733					Median Detects	0.783					CV Detects	0.328
734					Skewness Detects	0.654					Kurtosis Detects	-0.266
735					Mean of Logged Detects	-0.261					SD of Logged Detects	0.325
736												
737					**Normal GOF Test on Detects Only**							
738					Shapiro Wilk Test Statistic	0.899					**Shapiro Wilk GOF Test**	
739					5% Shapiro Wilk Critical Value	0.942					Detected Data Not Normal at 5% Significance Level	
740					Lilliefors Test Statistic	0.13					**Lilliefors GOF Test**	
741					5% Lilliefors Critical Value	0.135					Detected Data appear Normal at 5% Significance Level	
742					**Detected Data appear Approximate Normal at 5% Significance Level**							
743												
744					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
745					KM Mean	0.777					KM Standard Error of Mean	0.0407
746					KM SD	0.273					95% KM (BCA) UCL	0.846
747					95% KM (t) UCL	0.846					95% KM (Percentile Bootstrap) UCL	0.845
748					95% KM (z) UCL	0.844					95% KM Bootstrap t UCL	0.848
749					90% KM Chebyshev UCL	0.9					95% KM Chebyshev UCL	0.955
750					97.5% KM Chebyshev UCL	1.032					99% KM Chebyshev UCL	1.183
751												
752					**Gamma GOF Tests on Detected Observations Only**							
753					A-D Test Statistic	0.339					**Anderson-Darling GOF Test**	
754					5% A-D Critical Value	0.748					Detected data appear Gamma Distributed at 5% Significance Level	
755					K-S Test Statistic	0.102					**Kolmogorov-Smirnov GOF**	
756					5% K-S Critical Value	0.136					Detected data appear Gamma Distributed at 5% Significance Level	
757					**Detected data appear Gamma Distributed at 5% Significance Level**							
758												
759					**Gamma Statistics on Detected Data Only**							
760					k hat (MLE)	9.86					k star (bias corrected MLE)	9.172
761					Theta hat (MLE)	0.0823					Theta star (bias corrected MLE)	0.0885
762					nu hat (MLE)	828.2					nu star (bias corrected)	770.4
763					Mean (detects)	0.811						
764												
765					**Gamma ROS Statistics using Imputed Non-Detects**							
766					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
767					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
768					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
769					This is especially true when the sample size is small.							
770					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
771					Minimum	0.339					Mean	0.775
772					Maximum	1.44					Median	0.735
773					SD	0.278					CV	0.358
774					k hat (MLE)	8.065					k star (bias corrected MLE)	7.565
775					Theta hat (MLE)	0.0961					Theta star (bias corrected MLE)	0.102
776					nu hat (MLE)	758.1					nu star (bias corrected)	711.1
777					Adjusted Level of Significance (β)	0.0449						
778					Approximate Chi Square Value (711.09, α)	650.2					Adjusted Chi Square Value (711.09, β)	648.4
779					95% Gamma Approximate UCL (use when n>=50)	0.847					95% Gamma Adjusted UCL (use when n<50)	0.85
780												

	A	B	C	D	E	F	G	H	I	J	K	L
781	**Estimates of Gamma Parameters using KM Estimates**											
782					Mean (KM)	0.777				SD (KM)		0.273
783					Variance (KM)	0.0748				SE of Mean (KM)		0.0407
784					k hat (KM)	8.08				k star (KM)		7.579
785					nu hat (KM)	759.5				nu star (KM)		712.4
786					theta hat (KM)	0.0962				theta star (KM)		0.103
787					80% gamma percentile (KM)	1				90% gamma percentile (KM)		1.154
788					95% gamma percentile (KM)	1.293				99% gamma percentile (KM)		1.58
789												
790	**Gamma Kaplan-Meier (KM) Statistics**											
791					Approximate Chi Square Value (712.39, α)	651.5				Adjusted Chi Square Value (712.39, β)		649.6
792					95% Gamma Approximate KM-UCL (use when n>=50)	0.85				95% Gamma Adjusted KM-UCL (use when n<50)		0.853
793												
794	**Lognormal GOF Test on Detected Observations Only**											
795					Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**					
796					5% Shapiro Wilk Critical Value	0.942	Detected Data Not Lognormal at 5% Significance Level					
797					Lilliefors Test Statistic	0.0908	**Lilliefors GOF Test**					
798					5% Lilliefors Critical Value	0.135	Detected Data appear Lognormal at 5% Significance Level					
799	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
800												
801	**Lognormal ROS Statistics Using Imputed Non-Detects**											
802					Mean in Original Scale	0.777				Mean in Log Scale		-0.312
803					SD in Original Scale	0.274				SD in Log Scale		0.35
804					95% t UCL (assumes normality of ROS data)	0.844				95% Percentile Bootstrap UCL		0.84
805					95% BCA Bootstrap UCL	0.847				95% Bootstrap t UCL		0.849
806					95% H-UCL (Log ROS)	0.854						
807												
808	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
809					KM Mean (logged)	-0.313				KM Geo Mean		0.731
810					KM SD (logged)	0.352				95% Critical H Value (KM-Log)		1.794
811					KM Standard Error of Mean (logged)	0.0526				95% H-UCL (KM -Log)		0.854
812					KM SD (logged)	0.352				95% Critical H Value (KM-Log)		1.794
813					KM Standard Error of Mean (logged)	0.0526						
814												
815	**DL/2 Statistics**											
816					**DL/2 Normal**					**DL/2 Log-Transformed**		
817					Mean in Original Scale	0.76				Mean in Log Scale		-0.361
818					SD in Original Scale	0.298				SD in Log Scale		0.449
819					95% t UCL (Assumes normality)	0.833				95% H-Stat UCL		0.871
820	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
821												
822	**Nonparametric Distribution Free UCL Statistics**											
823	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
824												
825	**Suggested UCL to Use**											
826					95% KM (t) UCL	0.846						
827												
828	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
829	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
830												
831	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
832	Recommendations are based upon data size, data distribution, and skewness.											

	A	B	C	D	E	F	G	H	I	J	K	L
833	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
834	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
835												
836												
837	**Val_THALLIUM_208**											
838												
839	**General Statistics**											
840					Total Number of Observations	39			Number of Distinct Observations			38
841									Number of Missing Observations			0
842					Minimum	0.111			Mean			0.249
843					Maximum	0.435			Median			0.241
844					SD	0.0819			Std. Error of Mean			0.0131
845					Coefficient of Variation	0.329			Skewness			0.494
846												
847	**Normal GOF Test**											
848					Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**					
849					5% Shapiro Wilk Critical Value	0.939	Data appear Normal at 5% Significance Level					
850					Lilliefors Test Statistic	0.115	**Lilliefors GOF Test**					
851					5% Lilliefors Critical Value	0.14	Data appear Normal at 5% Significance Level					
852	**Data appear Normal at 5% Significance Level**											
853												
854	**Assuming Normal Distribution**											
855	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
856					95% Student's-t UCL	0.271			95% Adjusted-CLT UCL (Chen-1995)			0.271
857									95% Modified-t UCL (Johnson-1978)			0.271
858												
859	**Gamma GOF Test**											
860					A-D Test Statistic	0.371	**Anderson-Darling Gamma GOF Test**					
861					5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level					
862					K-S Test Statistic	0.103	**Kolmogorov-Smirnov Gamma GOF Test**					
863					5% K-S Critical Value	0.141	Detected data appear Gamma Distributed at 5% Significance Level					
864	**Detected data appear Gamma Distributed at 5% Significance Level**											
865												
866	**Gamma Statistics**											
867					k hat (MLE)	9.532			k star (bias corrected MLE)			8.816
868					Theta hat (MLE)	0.0261			Theta star (bias corrected MLE)			0.0282
869					nu hat (MLE)	743.5			nu star (bias corrected)			687.7
870					MLE Mean (bias corrected)	0.249			MLE Sd (bias corrected)			0.0838
871									Approximate Chi Square Value (0.05)			627.8
872					Adjusted Level of Significance	0.0437			Adjusted Chi Square Value			625.6
873												
874	**Assuming Gamma Distribution**											
875					95% Approximate Gamma UCL (use when n>=50))	0.273			95% Adjusted Gamma UCL (use when n<50)			0.274
876												
877	**Lognormal GOF Test**											
878					Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**					
879					5% Shapiro Wilk Critical Value	0.939	Data appear Lognormal at 5% Significance Level					
880					Lilliefors Test Statistic	0.0944	**Lilliefors Lognormal GOF Test**					
881					5% Lilliefors Critical Value	0.14	Data appear Lognormal at 5% Significance Level					
882	**Data appear Lognormal at 5% Significance Level**											
883												
884	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
885					Minimum of Logged Data	-2.198				Mean of logged Data		-1.444
886					Maximum of Logged Data	-0.832				SD of logged Data		0.334
887												
888	**Assuming Lognormal Distribution**											
889					95% H-UCL	0.275			90% Chebyshev (MVUE) UCL			0.29
890					95% Chebyshev (MVUE) UCL	0.308			97.5% Chebyshev (MVUE) UCL			0.334
891					99% Chebyshev (MVUE) UCL	0.384						
892												
893	**Nonparametric Distribution Free UCL Statistics**											
894	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
895												
896	**Nonparametric Distribution Free UCLs**											
897					95% CLT UCL	0.27			95% Jackknife UCL			0.271
898					95% Standard Bootstrap UCL	0.27			95% Bootstrap-t UCL			0.272
899					95% Hall's Bootstrap UCL	0.271			95% Percentile Bootstrap UCL			0.271
900					95% BCA Bootstrap UCL	0.271						
901					90% Chebyshev(Mean, Sd) UCL	0.288			95% Chebyshev(Mean, Sd) UCL			0.306
902					97.5% Chebyshev(Mean, Sd) UCL	0.331			99% Chebyshev(Mean, Sd) UCL			0.379
903												
904	**Suggested UCL to Use**											
905					95% Student's-t UCL	0.271						
906												
907	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
908	Recommendations are based upon data size, data distribution, and skewness.											
909	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
910	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
911												
912	**Val_THORIUM_234**											
913												
914	**General Statistics**											
915					Total Number of Observations	24			Number of Distinct Observations			24
916					Number of Detects	16			Number of Non-Detects			8
917					Number of Distinct Detects	16			Number of Distinct Non-Detects			8
918					Minimum Detect	0.588			Minimum Non-Detect			1.04
919					Maximum Detect	1.76			Maximum Non-Detect			12
920					Variance Detects	0.0772			Percent Non-Detects			33.33%
921					Mean Detects	1			SD Detects			0.278
922					Median Detects	0.931			CV Detects			0.278
923					Skewness Detects	1.256			Kurtosis Detects			2.802
924					Mean of Logged Detects	-0.0333			SD of Logged Detects			0.263
925												
926	**Normal GOF Test on Detects Only**											
927					Shapiro Wilk Test Statistic	0.915			**Shapiro Wilk GOF Test**			
928					5% Shapiro Wilk Critical Value	0.887			Detected Data appear Normal at 5% Significance Level			
929					Lilliefors Test Statistic	0.136			**Lilliefors GOF Test**			
930					5% Lilliefors Critical Value	0.213			Detected Data appear Normal at 5% Significance Level			
931	**Detected Data appear Normal at 5% Significance Level**											
932												
933	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
934					KM Mean	0.976			KM Standard Error of Mean			0.0595
935					KM SD	0.25			95% KM (BCA) UCL			1.074
936					95% KM (t) UCL	1.078			95% KM (Percentile Bootstrap) UCL			1.077

	A	B	C	D	E	F	G	H	I	J	K	L
937					95% KM (z) UCL	1.074				95% KM Bootstrap t UCL		1.091
938					90% KM Chebyshev UCL	1.154				95% KM Chebyshev UCL		1.235
939					97.5% KM Chebyshev UCL	1.348				99% KM Chebyshev UCL		1.568
940												
941					**Gamma GOF Tests on Detected Observations Only**							
942					A-D Test Statistic	0.271	**Anderson-Darling GOF Test**					
943					5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level					
944					K-S Test Statistic	0.112	**Kolmogorov-Smirnov GOF**					
945					5% K-S Critical Value	0.215	Detected data appear Gamma Distributed at 5% Significance Level					
946					**Detected data appear Gamma Distributed at 5% Significance Level**							
947												
948					**Gamma Statistics on Detected Data Only**							
949					k hat (MLE)	15.21				k star (bias corrected MLE)		12.4
950					Theta hat (MLE)	0.0658				Theta star (bias corrected MLE)		0.0807
951					nu hat (MLE)	486.6				nu star (bias corrected)		396.7
952					Mean (detects)	1						
953												
954					**Gamma ROS Statistics using Imputed Non-Detects**							
955					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
956					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
957					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
958					This is especially true when the sample size is small.							
959					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
960					Minimum	0.588				Mean		0.974
961					Maximum	1.76				Median		0.938
962					SD	0.228				CV		0.234
963					k hat (MLE)	21.8				k star (bias corrected MLE)		19.1
964					Theta hat (MLE)	0.0447				Theta star (bias corrected MLE)		0.051
965					nu hat (MLE)	1046				nu star (bias corrected)		916.7
966					Adjusted Level of Significance (β)	0.0392						
967					Approximate Chi Square Value (916.73, α)	847.5				Adjusted Chi Square Value (916.73, β)		842.8
968					95% Gamma Approximate UCL (use when n>=50)	1.054				95% Gamma Adjusted UCL (use when n<50)		1.06
969												
970					**Estimates of Gamma Parameters using KM Estimates**							
971					Mean (KM)	0.976				SD (KM)		0.25
972					Variance (KM)	0.0624				SE of Mean (KM)		0.0595
973					k hat (KM)	15.26				k star (KM)		13.38
974					nu hat (KM)	732.6				nu star (KM)		642.4
975					theta hat (KM)	0.0639				theta star (KM)		0.0729
976					80% gamma percentile (KM)	1.191				90% gamma percentile (KM)		1.33
977					95% gamma percentile (KM)	1.452				99% gamma percentile (KM)		1.701
978												
979					**Gamma Kaplan-Meier (KM) Statistics**							
980					Approximate Chi Square Value (642.39, α)	584.6				Adjusted Chi Square Value (642.39, β)		580.7
981					95% Gamma Approximate KM-UCL (use when n>=50)	1.072				95% Gamma Adjusted KM-UCL (use when n<50)		1.08
982												
983					**Lognormal GOF Test on Detected Observations Only**							
984					Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk GOF Test**					
985					5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level					
986					Lilliefors Test Statistic	0.126	**Lilliefors GOF Test**					
987					5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level					
988					**Detected Data appear Lognormal at 5% Significance Level**							

989												
990	**Lognormal ROS Statistics Using Imputed Non-Detects**											
991					Mean in Original Scale	0.971			Mean in Log Scale	-0.0522		
992					SD in Original Scale	0.229			SD in Log Scale	0.215		
993					95% t UCL (assumes normality of ROS data)	1.052			95% Percentile Bootstrap UCL	1.053		
994					95% BCA Bootstrap UCL	1.064			95% Bootstrap t UCL	1.085		
995					95% H-UCL (Log ROS)	1.052						
996												
997	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
998					KM Mean (logged)	-0.0545			KM Geo Mean	0.947		
999					KM SD (logged)	0.243			95% Critical H Value (KM-Log)	1.791		
1000					KM Standard Error of Mean (logged)	0.0595			95% H-UCL (KM -Log)	1.068		
1001					KM SD (logged)	0.243			95% Critical H Value (KM-Log)	1.791		
1002					KM Standard Error of Mean (logged)	0.0595						
1003												
1004	**DL/2 Statistics**											
1005					**DL/2 Normal**				**DL/2 Log-Transformed**			
1006					Mean in Original Scale	1.152			Mean in Log Scale	-0.0306		
1007					SD in Original Scale	1.078			SD in Log Scale	0.497		
1008					95% t UCL (Assumes normality)	1.53			95% H-Stat UCL	1.348		
1009	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1010												
1011	**Nonparametric Distribution Free UCL Statistics**											
1012	**Detected Data appear Normal Distributed at 5% Significance Level**											
1013												
1014	**Suggested UCL to Use**											
1015					95% KM (t) UCL	1.078						
1016												
1017	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1018	Recommendations are based upon data size, data distribution, and skewness.											
1019	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1020	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1021												
1022	**Val_URANIUM_235**											
1023												
1024	**General Statistics**											
1025					Total Number of Observations	15			Number of Distinct Observations	15		
1026					Number of Detects	11			Number of Non-Detects	4		
1027					Number of Distinct Detects	11			Number of Distinct Non-Detects	4		
1028					Minimum Detect	0.0597			Minimum Non-Detect	0.0545		
1029					Maximum Detect	0.215			Maximum Non-Detect	0.154		
1030					Variance Detects	0.00272			Percent Non-Detects	26.67%		
1031					Mean Detects	0.105			SD Detects	0.0521		
1032					Median Detects	0.0849			CV Detects	0.496		
1033					Skewness Detects	1.126			Kurtosis Detects	0.449		
1034					Mean of Logged Detects	-2.354			SD of Logged Detects	0.458		
1035												
1036	**Normal GOF Test on Detects Only**											
1037					Shapiro Wilk Test Statistic	0.844			**Shapiro Wilk GOF Test**			
1038					5% Shapiro Wilk Critical Value	0.85			Detected Data Not Normal at 5% Significance Level			
1039					Lilliefors Test Statistic	0.21			**Lilliefors GOF Test**			
1040					5% Lilliefors Critical Value	0.251			Detected Data appear Normal at 5% Significance Level			

1041	**Detected Data appear Approximate Normal at 5% Significance Level**											
1042												
1043	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1044					KM Mean	0.0937			KM Standard Error of Mean	0.0129		
1045					KM SD	0.0473			95% KM (BCA) UCL	0.116		
1046					95% KM (t) UCL	0.116			95% KM (Percentile Bootstrap) UCL	0.116		
1047					95% KM (z) UCL	0.115			95% KM Bootstrap t UCL	0.128		
1048					90% KM Chebyshev UCL	0.132			95% KM Chebyshev UCL	0.15		
1049					97.5% KM Chebyshev UCL	0.174			99% KM Chebyshev UCL	0.222		
1050												
1051	**Gamma GOF Tests on Detected Observations Only**											
1052					A-D Test Statistic	0.591			**Anderson-Darling GOF Test**			
1053					5% A-D Critical Value	0.731			Detected data appear Gamma Distributed at 5% Significance Level			
1054					K-S Test Statistic	0.225			**Kolmogorov-Smirnov GOF**			
1055					5% K-S Critical Value	0.256			Detected data appear Gamma Distributed at 5% Significance Level			
1056	**Detected data appear Gamma Distributed at 5% Significance Level**											
1057												
1058	**Gamma Statistics on Detected Data Only**											
1059					k hat (MLE)	5.141			k star (bias corrected MLE)	3.8		
1060					Theta hat (MLE)	0.0204			Theta star (bias corrected MLE)	0.0276		
1061					nu hat (MLE)	113.1			nu star (bias corrected)	83.6		
1062					Mean (detects)	0.105						
1063												
1064	**Gamma ROS Statistics using Imputed Non-Detects**											
1065	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1066	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1067	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1068	This is especially true when the sample size is small.											
1069	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1070					Minimum	0.0114			Mean	0.0881		
1071					Maximum	0.215			Median	0.0689		
1072					SD	0.0539			CV	0.612		
1073					k hat (MLE)	2.726			k star (bias corrected MLE)	2.225		
1074					Theta hat (MLE)	0.0323			Theta star (bias corrected MLE)	0.0396		
1075					nu hat (MLE)	81.78			nu star (bias corrected)	66.76		
1076					Adjusted Level of Significance (β)	0.0324						
1077					Approximate Chi Square Value (66.76, α)	48.96			Adjusted Chi Square Value (66.76, β)	47.08		
1078					95% Gamma Approximate UCL (use when n>=50)	0.12			95% Gamma Adjusted UCL (use when n<50)	0.125		
1079												
1080	**Estimates of Gamma Parameters using KM Estimates**											
1081					Mean (KM)	0.0937			SD (KM)	0.0473		
1082					Variance (KM)	0.00223			SE of Mean (KM)	0.0129		
1083					k hat (KM)	3.928			k star (KM)	3.187		
1084					nu hat (KM)	117.8			nu star (KM)	95.61		
1085					theta hat (KM)	0.0238			theta star (KM)	0.0294		
1086					80% gamma percentile (KM)	0.133			90% gamma percentile (KM)	0.164		
1087					95% gamma percentile (KM)	0.193			99% gamma percentile (KM)	0.256		
1088												
1089	**Gamma Kaplan-Meier (KM) Statistics**											
1090					Approximate Chi Square Value (95.61, α)	74.06			Adjusted Chi Square Value (95.61, β)	71.72		
1091					95% Gamma Approximate KM-UCL (use when n>=50)	0.121			95% Gamma Adjusted KM-UCL (use when n<50)	0.125		
1092												

	A	B	C	D	E	F	G	H	I	J	K	L
1093	**Lognormal GOF Test on Detected Observations Only**											
1094					Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk GOF Test**					
1095					5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level					
1096					Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**					
1097					5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level					
1098	**Detected Data appear Lognormal at 5% Significance Level**											
1099												
1100	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1101					Mean in Original Scale	0.0908			Mean in Log Scale			-2.526
1102					SD in Original Scale	0.0509			SD in Log Scale			0.51
1103					95% t UCL (assumes normality of ROS data)	0.114			95% Percentile Bootstrap UCL			0.114
1104					95% BCA Bootstrap UCL	0.117			95% Bootstrap t UCL			0.123
1105					95% H-UCL (Log ROS)	0.121						
1106												
1107	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1108					KM Mean (logged)	-2.472			KM Geo Mean			0.0844
1109					KM SD (logged)	0.434			95% Critical H Value (KM-Log)			2
1110					KM Standard Error of Mean (logged)	0.12			95% H-UCL (KM -Log)			0.117
1111					KM SD (logged)	0.434			95% Critical H Value (KM-Log)			2
1112					KM Standard Error of Mean (logged)	0.12						
1113												
1114	**DL/2 Statistics**											
1115	**DL/2 Normal**						**DL/2 Log-Transformed**					
1116					Mean in Original Scale	0.0881			Mean in Log Scale			-2.599
1117					SD in Original Scale	0.0538			SD in Log Scale			0.612
1118					95% t UCL (Assumes normality)	0.113			95% H-Stat UCL			0.128
1119	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1120												
1121	**Nonparametric Distribution Free UCL Statistics**											
1122	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
1123												
1124	**Suggested UCL to Use**											
1125					95% KM (t) UCL	0.116						
1126												
1127	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
1128	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
1129												
1130	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1131	Recommendations are based upon data size, data distribution, and skewness.											
1132	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1133	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1134												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/17/2017 11:05:52 AM								
5			From File	Soil540-Peck Soils=0-0.5_TEQ_Cong_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_TCDD_TEQ**											
12												
13	**General Statistics**											
14						Total Number of Observations	10			Number of Distinct Observations	10		
15										Number of Missing Observations	0	
16						Minimum	1.4617E-5			Mean	2.4485E-4	
17						Maximum	7.1477E-4			Median	1.7432E-4	
18						SD	2.3227E-4			Std. Error of Mean	7.3450E-5	
19						Coefficient of Variation	0.949			Skewness	1.479	
20												
21	**Normal GOF Test**											
22						Shapiro Wilk Test Statistic	0.784		**Shapiro Wilk GOF Test**			
23						5% Shapiro Wilk Critical Value	0.842		Data Not Normal at 5% Significance Level			
24						Lilliefors Test Statistic	0.337		**Lilliefors GOF Test**			
25						5% Lilliefors Critical Value	0.262		Data Not Normal at 5% Significance Level			
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29						**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**		
30						95% Student's-t UCL	3.7949E-4			95% Adjusted-CLT UCL (Chen-1995)	4.0236E-4	
31										95% Modified-t UCL (Johnson-1978)	3.8522E-4	
32												
33	**Gamma GOF Test**											
34						A-D Test Statistic	0.395		**Anderson-Darling Gamma GOF Test**			
35						5% A-D Critical Value	0.743		Detected data appear Gamma Distributed at 5% Significance Level			
36						K-S Test Statistic	0.223		**Kolmogorov-Smirnov Gamma GOF Test**			
37						5% K-S Critical Value	0.272		Detected data appear Gamma Distributed at 5% Significance Level			
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41						k hat (MLE)	1.289			k star (bias corrected MLE)	0.969	
42						Theta hat (MLE)	1.8997E-4			Theta star (bias corrected MLE)	2.5271E-4	
43						nu hat (MLE)	25.78			nu star (bias corrected)	19.38	
44						MLE Mean (bias corrected)	2.4485E-4			MLE Sd (bias corrected)	2.4875E-4	
45										Approximate Chi Square Value (0.05)	10.39	
46						Adjusted Level of Significance	0.0267			Adjusted Chi Square Value	9.271	
47												
48	**Assuming Gamma Distribution**											
49						95% Approximate Gamma UCL (use when n>=50)	4.5649E-4			95% Adjusted Gamma UCL (use when n<50)	5.1179E-4	
50												
51	**Lognormal GOF Test**											
52						Shapiro Wilk Test Statistic	0.917		**Shapiro Wilk Lognormal GOF Test**			

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.262	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	-11.13				Mean of logged Data	-8.751	
60					Maximum of Logged Data	-7.244				SD of logged Data	1.094	
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	9.5931E-4				90% Chebyshev (MVUE) UCL	5.5443E-4	
64					95% Chebyshev (MVUE) UCL	6.8554E-4				97.5% Chebyshev (MVUE) UCL	8.6752E-4	
65					99% Chebyshev (MVUE) UCL	0.00122						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	3.6566E-4				95% Jackknife UCL	3.7949E-4	
72					95% Standard Bootstrap UCL	3.5931E-4				95% Bootstrap-t UCL	6.0186E-4	
73					95% Hall's Bootstrap UCL	0.00128				95% Percentile Bootstrap UCL	3.6728E-4	
74					95% BCA Bootstrap UCL	3.9643E-4						
75					90% Chebyshev(Mean, Sd) UCL	4.6520E-4				95% Chebyshev(Mean, Sd) UCL	5.6501E-4	
76					97.5% Chebyshev(Mean, Sd) UCL	7.0355E-4				99% Chebyshev(Mean, Sd) UCL	9.7567E-4	
77												
78	**Suggested UCL to Use**											
79					95% Adjusted Gamma UCL	5.12E-04						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.112/5/2017 6:35:32 PM								
5			From File	Soil539-Peck_Soils=0-12_TEQ_Cong_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_TCDD_TEQ**											
12												
13	**General Statistics**											
14						Total Number of Observations	45			Number of Distinct Observations	45		
15										Number of Missing Observations	0	
16						Minimum	1.4301E-6			Mean	2.0114E-4	
17						Maximum	0.0012			Median	1.2012E-4	
18						SD	2.4434E-4			Std. Error of Mean	3.6424E-5	
19						Coefficient of Variation	1.215			Skewness	2.039	
20												
21	**Normal GOF Test**											
22						Shapiro Wilk Test Statistic	0.783		**Shapiro Wilk GOF Test**			
23						5% Shapiro Wilk Critical Value	0.945		Data Not Normal at 5% Significance Level			
24						Lilliefors Test Statistic	0.207		**Lilliefors GOF Test**			
25						5% Lilliefors Critical Value	0.131		Data Not Normal at 5% Significance Level			
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29						**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**		
30						95% Student's-t UCL	2.6235E-4			95% Adjusted-CLT UCL (Chen-1995)	2.7289E-4	
31										95% Modified-t UCL (Johnson-1978)	2.6419E-4	
32												
33	**Gamma GOF Test**											
34						A-D Test Statistic	0.238		**Anderson-Darling Gamma GOF Test**			
35						5% A-D Critical Value	0.803		Detected data appear Gamma Distributed at 5% Significance Level			
36						K-S Test Statistic	0.0643		**Kolmogorov-Smirnov Gamma GOF Test**			
37						5% K-S Critical Value	0.138		Detected data appear Gamma Distributed at 5% Significance Level			
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41						k hat (MLE)	0.608			k star (bias corrected MLE)	0.583	
42						Theta hat (MLE)	3.3070E-4			Theta star (bias corrected MLE)	3.4531E-4	
43						nu hat (MLE)	54.74			nu star (bias corrected)	52.43	
44						MLE Mean (bias corrected)	2.0114E-4			MLE Sd (bias corrected)	2.6355E-4	
45										Approximate Chi Square Value (0.05)	36.79	
46						Adjusted Level of Significance	0.0447			Adjusted Chi Square Value	36.36	
47												
48	**Assuming Gamma Distribution**											
49						95% Approximate Gamma UCL (use when n>=50)	2.8660E-4			95% Adjusted Gamma UCL (use when n<50)	2.9002E-4	
50												
51	**Lognormal GOF Test**											
52						Shapiro Wilk Test Statistic	0.921		**Shapiro Wilk Lognormal GOF Test**			

53	5% Shapiro Wilk Critical Value					0.945	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.139	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.131	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					-13.46	Mean of logged Data					-9.525
60	Maximum of Logged Data					-6.724	SD of logged Data					1.806
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					9.4349E-4	90% Chebyshev (MVUE) UCL					7.2660E-4
64	95% Chebyshev (MVUE) UCL					9.0098E-4	97.5% Chebyshev (MVUE) UCL					0.00114
65	99% Chebyshev (MVUE) UCL					0.00162						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					2.6106E-4	95% Jackknife UCL					2.6235E-4
72	95% Standard Bootstrap UCL					2.5914E-4	95% Bootstrap-t UCL					2.7789E-4
73	95% Hall's Bootstrap UCL					2.8096E-4	95% Percentile Bootstrap UCL					2.6095E-4
74	95% BCA Bootstrap UCL					2.7252E-4						
75	90% Chebyshev(Mean, Sd) UCL					3.1042E-4	95% Chebyshev(Mean, Sd) UCL					3.5991E-4
76	97.5% Chebyshev(Mean, Sd) UCL					4.2861E-4	99% Chebyshev(Mean, Sd) UCL					5.6356E-4
77												
78	**Suggested UCL to Use**											
79	95% Adjusted Gamma UCL					2.9002E-4						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86												
87	**Val_PCB_HiRiskCong**											
88												
89	**General Statistics**											
90	Total Number of Observations					26	Number of Distinct Observations					26
91							Number of Missing Observations					0
92	Minimum					0.00306	Mean					96.71
93	Maximum					1394	Median					4.171
94	SD					324.1	Std. Error of Mean					63.56
95	Coefficient of Variation					3.351	Skewness					3.578
96												
97	**Normal GOF Test**											
98	Shapiro Wilk Test Statistic					0.329	**Shapiro Wilk GOF Test**					
99	5% Shapiro Wilk Critical Value					0.92	Data Not Normal at 5% Significance Level					
100	Lilliefors Test Statistic					0.493	**Lilliefors GOF Test**					
101	5% Lilliefors Critical Value					0.17	Data Not Normal at 5% Significance Level					
102	**Data Not Normal at 5% Significance Level**											
103												
104	**Assuming Normal Distribution**											

105	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
106					95% Student's-t UCL	205.3					95% Adjusted-CLT UCL (Chen-1995)	248.9
107											95% Modified-t UCL (Johnson-1978)	212.7
108												
109	**Gamma GOF Test**											
110					A-D Test Statistic	2.988	**Anderson-Darling Gamma GOF Test**					
111					5% A-D Critical Value	0.896	Data Not Gamma Distributed at 5% Significance Level					
112					K-S Test Statistic	0.334	**Kolmogorov-Smirnov Gamma GOF Test**					
113					5% K-S Critical Value	0.19	Data Not Gamma Distributed at 5% Significance Level					
114	**Data Not Gamma Distributed at 5% Significance Level**											
115												
116	**Gamma Statistics**											
117					k hat (MLE)	0.211					k star (bias corrected MLE)	0.212
118					Theta hat (MLE)	458.5					Theta star (bias corrected MLE)	455.7
119					nu hat (MLE)	10.97					nu star (bias corrected)	11.04
120					MLE Mean (bias corrected)	96.71					MLE Sd (bias corrected)	209.9
121											Approximate Chi Square Value (0.05)	4.599
122					Adjusted Level of Significance	0.0398					Adjusted Chi Square Value	4.327
123												
124	**Assuming Gamma Distribution**											
125					95% Approximate Gamma UCL (use when n>=50))	232.1					95% Adjusted Gamma UCL (use when n<50)	246.7
126												
127	**Lognormal GOF Test**											
128					Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**					
129					5% Shapiro Wilk Critical Value	0.92	Data appear Lognormal at 5% Significance Level					
130					Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**					
131					5% Lilliefors Critical Value	0.17	Data appear Lognormal at 5% Significance Level					
132	**Data appear Lognormal at 5% Significance Level**											
133												
134	**Lognormal Statistics**											
135					Minimum of Logged Data	-5.791					Mean of logged Data	1.111
136					Maximum of Logged Data	7.24					SD of logged Data	2.821
137												
138	**Assuming Lognormal Distribution**											
139					95% H-UCL	3403					90% Chebyshev (MVUE) UCL	294.1
140					95% Chebyshev (MVUE) UCL	385.3					97.5% Chebyshev (MVUE) UCL	512
141					99% Chebyshev (MVUE) UCL	760.8						
142												
143	**Nonparametric Distribution Free UCL Statistics**											
144	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
145												
146	**Nonparametric Distribution Free UCLs**											
147					95% CLT UCL	201.3					95% Jackknife UCL	205.3
148					95% Standard Bootstrap UCL	198.8					95% Bootstrap-t UCL	3785
149					95% Hall's Bootstrap UCL	2674					95% Percentile Bootstrap UCL	203.9
150					95% BCA Bootstrap UCL	256.9						
151					90% Chebyshev(Mean, Sd) UCL	287.4					95% Chebyshev(Mean, Sd) UCL	373.8
152					97.5% Chebyshev(Mean, Sd) UCL	493.7					99% Chebyshev(Mean, Sd) UCL	729.2
153												
154	**Suggested UCL to Use**											
155					99% Chebyshev (Mean, Sd) UCL	729.2						
156												

	A	B	C	D	E	F	G	H	I	J	K	L
157	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
158	Recommendations are based upon data size, data distribution, and skewness.											
159	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
160	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
161												
162												
163	**Val_PCB_Cong_TEQ**											
164												
165	**General Statistics**											
166					Total Number of Observations	26			Number of Distinct Observations			26
167									Number of Missing Observations			0
168					Minimum	4.9700E-9			Mean			1.4393E-4
169					Maximum	0.00164			Median			1.2160E-5
170					SD	4.2126E-4			Std. Error of Mean			8.2616E-5
171					Coefficient of Variation	2.927			Skewness			3.308
172												
173	**Normal GOF Test**											
174					Shapiro Wilk Test Statistic	0.372		**Shapiro Wilk GOF Test**				
175					5% Shapiro Wilk Critical Value	0.92		Data Not Normal at 5% Significance Level				
176					Lilliefors Test Statistic	0.427		**Lilliefors GOF Test**				
177					5% Lilliefors Critical Value	0.17		Data Not Normal at 5% Significance Level				
178	**Data Not Normal at 5% Significance Level**											
179												
180	**Assuming Normal Distribution**											
181					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
182					95% Student's-t UCL	2.8505E-4			95% Adjusted-CLT UCL (Chen-1995)			3.3709E-4
183									95% Modified-t UCL (Johnson-1978)			2.9399E-4
184												
185	**Gamma GOF Test**											
186					A-D Test Statistic	1.967		**Anderson-Darling Gamma GOF Test**				
187					5% A-D Critical Value	0.883		Data Not Gamma Distributed at 5% Significance Level				
188					K-S Test Statistic	0.289		**Kolmogorov-Smirnov Gamma GOF Test**				
189					5% K-S Critical Value	0.189		Data Not Gamma Distributed at 5% Significance Level				
190	**Data Not Gamma Distributed at 5% Significance Level**											
191												
192	**Gamma Statistics**											
193					k hat (MLE)	0.236			k star (bias corrected MLE)			0.234
194					Theta hat (MLE)	6.0981E-4			Theta star (bias corrected MLE)			6.1395E-4
195					nu hat (MLE)	12.27			nu star (bias corrected)			12.19
196					MLE Mean (bias corrected)	1.4393E-4			MLE Sd (bias corrected)			2.9727E-4
197									Approximate Chi Square Value (0.05)			5.353
198					Adjusted Level of Significance	0.0398			Adjusted Chi Square Value			5.055
199												
200	**Assuming Gamma Distribution**											
201					95% Approximate Gamma UCL (use when n>=50))	3.2780E-4			95% Adjusted Gamma UCL (use when n<50)			3.4709E-4
202												
203	**Lognormal GOF Test**											
204					Shapiro Wilk Test Statistic	0.954		**Shapiro Wilk Lognormal GOF Test**				
205					5% Shapiro Wilk Critical Value	0.92		Data appear Lognormal at 5% Significance Level				
206					Lilliefors Test Statistic	0.188		**Lilliefors Lognormal GOF Test**				
207					5% Lilliefors Critical Value	0.17		Data Not Lognormal at 5% Significance Level				
208	**Data appear Approximate Lognormal at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
209												
210	**Lognormal Statistics**											
211					Minimum of Logged Data	-19.12				Mean of logged Data		-11.88
212					Maximum of Logged Data	-6.415				SD of logged Data		2.9
213												
214	**Assuming Lognormal Distribution**											
215					95% H-UCL	0.0114				90% Chebyshev (MVUE) UCL		8.0905E-4
216					95% Chebyshev (MVUE) UCL	0.00106				97.5% Chebyshev (MVUE) UCL		0.00141
217					99% Chebyshev (MVUE) UCL	0.0021						
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
221												
222	**Nonparametric Distribution Free UCLs**											
223					95% CLT UCL	2.7983E-4				95% Jackknife UCL		2.8505E-4
224					95% Standard Bootstrap UCL	2.7488E-4				95% Bootstrap-t UCL		0.00128
225					95% Hall's Bootstrap UCL	0.0013				95% Percentile Bootstrap UCL		2.7486E-4
226					95% BCA Bootstrap UCL	3.3947E-4						
227					90% Chebyshev(Mean, Sd) UCL	3.9178E-4				95% Chebyshev(Mean, Sd) UCL		5.0405E-4
228					97.5% Chebyshev(Mean, Sd) UCL	6.5987E-4				99% Chebyshev(Mean, Sd) UCL		9.6596E-4
229												
230	**Suggested UCL to Use**											
231					99% Chebyshev (Mean, Sd) UCL	9.6596E-4						
232												
233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
234	Recommendations are based upon data size, data distribution, and skewness.											
235	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
236	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
237												

Freshwater Wetland Sediments

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.112/1/2017 3:43:59 PM
From File	SED534-FW_Wtld-Sed=0-2_Formatted_Data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_MANGANESE

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	8.5	Mean	67.45
Maximum	243	Median	28
SD	83.17	Std. Error of Mean	29.4
Coefficient of Variation	1.233	Skewness	1.725

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

Normal GOF Test

Shapiro Wilk Test Statistic	0.748	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	123.2	95% Adjusted-CLT UCL (Chen-1995)	135
		95% Modified-t UCL (Johnson-1978)	126.1

Gamma GOF Test

A-D Test Statistic	0.447	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.24	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.302	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.931	k star (bias corrected MLE)	0.665
Theta hat (MLE)	72.44	Theta star (bias corrected MLE)	101.4
nu hat (MLE)	14.9	nu star (bias corrected)	10.64
MLE Mean (bias corrected)	67.45	MLE Sd (bias corrected)	82.7
		Approximate Chi Square Value (0.05)	4.348
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	3.39

	A	B	C	D	E	F	G	H	I	J	K	L
53	**Assuming Gamma Distribution**											
54	95% Approximate Gamma UCL (use when n>=50)					165.1	95% Adjusted Gamma UCL (use when n<50)					211.8
55												
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic					0.939	**Shapiro Wilk Lognormal GOF Test**					
58	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic					0.173	**Lilliefors Lognormal GOF Test**					
60	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
61	**Data appear Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data					2.14	Mean of logged Data					3.586
65	Maximum of Logged Data					5.493	SD of logged Data					1.191
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL					426.8	90% Chebyshev (MVUE) UCL					148
69	95% Chebyshev (MVUE) UCL					185.7	97.5% Chebyshev (MVUE) UCL					238
70	99% Chebyshev (MVUE) UCL					340.9						
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL					115.8	95% Jackknife UCL					123.2
77	95% Standard Bootstrap UCL					112.9	95% Bootstrap-t UCL					289.7
78	95% Hall's Bootstrap UCL					361.9	95% Percentile Bootstrap UCL					116.2
79	95% BCA Bootstrap UCL					133.8						
80	90% Chebyshev(Mean, Sd) UCL					155.7	95% Chebyshev(Mean, Sd) UCL					195.6
81	97.5% Chebyshev(Mean, Sd) UCL					251.1	99% Chebyshev(Mean, Sd) UCL					360
82												
83	**Suggested UCL to Use**											
84	95% Adjusted Gamma UCL					211.8						
85												
86	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
87	Recommendations are based upon data size, data distribution, and skewness.											
88	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
89	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
90												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/14/2017 8:34:07 PM
From File	SED534-FW_Wtld-Sed=0-2_Formatted_Data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_ARSENIC

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.1	Mean	5.625
Maximum	25.1	Median	2.85
SD	7.994	Std. Error of Mean	2.826
Coefficient of Variation	1.421	Skewness	2.658

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

Normal GOF Test

Shapiro Wilk Test Statistic	0.581	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.411	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	10.98	95% Adjusted-CLT UCL (Chen-1995)	13.11
		95% Modified-t UCL (Johnson-1978)	11.42

Gamma GOF Test

A-D Test Statistic	0.784	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.734	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.301	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.301	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.089	k star (bias corrected MLE)	0.764
Theta hat (MLE)	5.163	Theta star (bias corrected MLE)	7.36
nu hat (MLE)	17.43	nu star (bias corrected)	12.23
MLE Mean (bias corrected)	5.625	MLE Sd (bias corrected)	6.434
		Approximate Chi Square Value (0.05)	5.378
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	4.286

53	**Assuming Gamma Distribution**											
54	95% Approximate Gamma UCL (use when n>=50))					12.79	95% Adjusted Gamma UCL (use when n<50)					16.05
55												
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic					0.897	**Shapiro Wilk Lognormal GOF Test**					
58	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic					0.22	**Lilliefors Lognormal GOF Test**					
60	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
61	**Data appear Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data					0.0953	Mean of logged Data					1.203
65	Maximum of Logged Data					3.223	SD of logged Data					0.969
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL					18.15	90% Chebyshev (MVUE) UCL					10.11
69	95% Chebyshev (MVUE) UCL					12.46	97.5% Chebyshev (MVUE) UCL					15.71
70	99% Chebyshev (MVUE) UCL					22.11						
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL					10.27	95% Jackknife UCL					10.98
77	95% Standard Bootstrap UCL					9.912	95% Bootstrap-t UCL					27.91
78	95% Hall's Bootstrap UCL					28.67	95% Percentile Bootstrap UCL					10.98
79	95% BCA Bootstrap UCL					11.96						
80	90% Chebyshev(Mean, Sd) UCL					14.1	95% Chebyshev(Mean, Sd) UCL					17.94
81	97.5% Chebyshev(Mean, Sd) UCL					23.28	99% Chebyshev(Mean, Sd) UCL					33.75
82												
83	**Suggested UCL to Use**											
84	95% H-UCL					18.15						
85												
86	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
87	Recommendations are based upon data size, data distribution, and skewness.											
88	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
89	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
90												
91	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
92	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
93	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
94	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
95												
96												
97	**Val_CHROMIUM**											
98												
99	**General Statistics**											
100	Total Number of Observations					8	Number of Distinct Observations					8
101							Number of Missing Observations					0
102	Minimum					9	Mean					14.66
103	Maximum					28	Median					13.6
104	SD					5.743	Std. Error of Mean					2.03

105					Coefficient of Variation	0.392					Skewness	2.135
106												
107	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
108	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
109	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
110	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
111												
112	**Normal GOF Test**											
113					Shapiro Wilk Test Statistic	0.744	**Shapiro Wilk GOF Test**					
114					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
115					Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**					
116					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					
117	**Data Not Normal at 5% Significance Level**											
118												
119	**Assuming Normal Distribution**											
120	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
121					95% Student's-t UCL	18.51	95% Adjusted-CLT UCL (Chen-1995)					19.64
122							95% Modified-t UCL (Johnson-1978)					18.76
123												
124	**Gamma GOF Test**											
125					A-D Test Statistic	0.704	**Anderson-Darling Gamma GOF Test**					
126					5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level					
127					K-S Test Statistic	0.296	**Kolmogorov-Smirnov Gamma GOF Test**					
128					5% K-S Critical Value	0.294	Data Not Gamma Distributed at 5% Significance Level					
129	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
130												
131	**Gamma Statistics**											
132					k hat (MLE)	9.638	k star (bias corrected MLE)					6.107
133					Theta hat (MLE)	1.521	Theta star (bias corrected MLE)					2.401
134					nu hat (MLE)	154.2	nu star (bias corrected)					97.71
135					MLE Mean (bias corrected)	14.66	MLE Sd (bias corrected)					5.933
136							Approximate Chi Square Value (0.05)					75.91
137					Adjusted Level of Significance	0.0195	Adjusted Chi Square Value					71.06
138												
139	**Assuming Gamma Distribution**											
140					95% Approximate Gamma UCL (use when n>=50)	18.87	95% Adjusted Gamma UCL (use when n<50)					20.16
141												
142	**Lognormal GOF Test**											
143					Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk Lognormal GOF Test**					
144					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
145					Lilliefors Test Statistic	0.277	**Lilliefors Lognormal GOF Test**					
146					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
147	**Data appear Lognormal at 5% Significance Level**											
148												
149	**Lognormal Statistics**											
150					Minimum of Logged Data	2.197	Mean of logged Data					2.633
151					Maximum of Logged Data	3.332	SD of logged Data					0.33
152												
153	**Assuming Lognormal Distribution**											
154					95% H-UCL	19.07	90% Chebyshev (MVUE) UCL					19.7
155					95% Chebyshev (MVUE) UCL	22.02	97.5% Chebyshev (MVUE) UCL					25.24
156					99% Chebyshev (MVUE) UCL	31.57						

	A	B	C	D	E	F	G	H	I	J	K	L
157												
158	**Nonparametric Distribution Free UCL Statistics**											
159	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
160												
161	**Nonparametric Distribution Free UCLs**											
162	95% CLT UCL					18			95% Jackknife UCL			18.51
163	95% Standard Bootstrap UCL					17.77			95% Bootstrap-t UCL			21.96
164	95% Hall's Bootstrap UCL					33.7			95% Percentile Bootstrap UCL			18.15
165	95% BCA Bootstrap UCL					19.19						
166	90% Chebyshev(Mean, Sd) UCL					20.75			95% Chebyshev(Mean, Sd) UCL			23.51
167	97.5% Chebyshev(Mean, Sd) UCL					27.34			99% Chebyshev(Mean, Sd) UCL			34.86
168												
169	**Suggested UCL to Use**											
170	95% Adjusted Gamma UCL					20.16						
171												
172	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
173	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
174												
175	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
176	Recommendations are based upon data size, data distribution, and skewness.											
177	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
178	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
179												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/27/2017 5:50:05 PM
From File	SED534-FW_Wtld-Sed=0-2_Formatted_Data_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_BISMUTH_212

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.592	Mean	0.766
Maximum	0.964	Median	0.742
SD	0.121	Std. Error of Mean	0.0428
Coefficient of Variation	0.158	Skewness	0.336

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

Normal GOF Test

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.847	95% Adjusted-CLT UCL (Chen-1995)	0.842
		95% Modified-t UCL (Johnson-1978)	0.848

Gamma GOF Test

A-D Test Statistic	0.159	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.14	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.293	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	46	k star (bias corrected MLE)	28.83
Theta hat (MLE)	0.0166	Theta star (bias corrected MLE)	0.0266
nu hat (MLE)	735.9	nu star (bias corrected)	461.3
MLE Mean (bias corrected)	0.766	MLE Sd (bias corrected)	0.143
		Approximate Chi Square Value (0.05)	412.5
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	400.8

53	**Assuming Gamma Distribution**											
54	95% Approximate Gamma UCL (use when n>=50))					0.856	95% Adjusted Gamma UCL (use when n<50)					0.881
55												
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic					0.987	**Shapiro Wilk Lognormal GOF Test**					
58	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic					0.13	**Lilliefors Lognormal GOF Test**					
60	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
61	**Data appear Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data					-0.524	Mean of logged Data					-0.278
65	Maximum of Logged Data					-0.0367	SD of logged Data					0.158
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL					0.859	90% Chebyshev (MVUE) UCL					0.894
69	95% Chebyshev (MVUE) UCL					0.952	97.5% Chebyshev (MVUE) UCL					1.033
70	99% Chebyshev (MVUE) UCL					1.192						
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL					0.836	95% Jackknife UCL					0.847
77	95% Standard Bootstrap UCL					0.834	95% Bootstrap-t UCL					0.859
78	95% Hall's Bootstrap UCL					0.847	95% Percentile Bootstrap UCL					0.835
79	95% BCA Bootstrap UCL					0.83						
80	90% Chebyshev(Mean, Sd) UCL					0.894	95% Chebyshev(Mean, Sd) UCL					0.952
81	97.5% Chebyshev(Mean, Sd) UCL					1.033	99% Chebyshev(Mean, Sd) UCL					1.192
82												
83	**Suggested UCL to Use**											
84	95% Student's-t UCL					0.847						
85												
86	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
87	Recommendations are based upon data size, data distribution, and skewness.											
88	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
89	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
90												
91												
92	**Val_BISMUTH_214**											
93												
94	**General Statistics**											
95	Total Number of Observations					8	Number of Distinct Observations					8
96							Number of Missing Observations					0
97	Minimum					0.557	Mean					0.734
98	Maximum					1.37	Median					0.652
99	SD					0.265	Std. Error of Mean					0.0939
100	Coefficient of Variation					0.362	Skewness					2.5
101												
102	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
103	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
104	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											

105	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
106												
107	**Normal GOF Test**											
108					Shapiro Wilk Test Statistic	0.639	**Shapiro Wilk GOF Test**					
109					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
110					Lilliefors Test Statistic	0.361	**Lilliefors GOF Test**					
111					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					
112	**Data Not Normal at 5% Significance Level**											
113												
114	**Assuming Normal Distribution**											
115				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
116					95% Student's-t UCL	0.912			95% Adjusted-CLT UCL (Chen-1995)	0.977		
117									95% Modified-t UCL (Johnson-1978)	0.925		
118												
119	**Gamma GOF Test**											
120					A-D Test Statistic	1.132	**Anderson-Darling Gamma GOF Test**					
121					5% A-D Critical Value	0.715	Data Not Gamma Distributed at 5% Significance Level					
122					K-S Test Statistic	0.356	**Kolmogorov-Smirnov Gamma GOF Test**					
123					5% K-S Critical Value	0.294	Data Not Gamma Distributed at 5% Significance Level					
124	**Data Not Gamma Distributed at 5% Significance Level**											
125												
126	**Gamma Statistics**											
127					k hat (MLE)	12.04			k star (bias corrected MLE)	7.607		
128					Theta hat (MLE)	0.061			Theta star (bias corrected MLE)	0.0965		
129					nu hat (MLE)	192.6			nu star (bias corrected)	121.7		
130					MLE Mean (bias corrected)	0.734			MLE Sd (bias corrected)	0.266		
131									Approximate Chi Square Value (0.05)	97.23		
132					Adjusted Level of Significance	0.0195			Adjusted Chi Square Value	91.71		
133												
134	**Assuming Gamma Distribution**											
135					95% Approximate Gamma UCL (use when n>=50))	0.919			95% Adjusted Gamma UCL (use when n<50)	0.974		
136												
137	**Lognormal GOF Test**											
138					Shapiro Wilk Test Statistic	0.728	**Shapiro Wilk Lognormal GOF Test**					
139					5% Shapiro Wilk Critical Value	0.818	Data Not Lognormal at 5% Significance Level					
140					Lilliefors Test Statistic	0.34	**Lilliefors Lognormal GOF Test**					
141					5% Lilliefors Critical Value	0.283	Data Not Lognormal at 5% Significance Level					
142	**Data Not Lognormal at 5% Significance Level**											
143												
144	**Lognormal Statistics**											
145					Minimum of Logged Data	-0.585			Mean of logged Data	-0.352		
146					Maximum of Logged Data	0.315			SD of logged Data	0.287		
147												
148	**Assuming Lognormal Distribution**											
149					95% H-UCL	0.915			90% Chebyshev (MVUE) UCL	0.952		
150					95% Chebyshev (MVUE) UCL	1.053			97.5% Chebyshev (MVUE) UCL	1.194		
151					99% Chebyshev (MVUE) UCL	1.469						
152												
153	**Nonparametric Distribution Free UCL Statistics**											
154	**Data do not follow a Discernible Distribution (0.05)**											
155												
156	**Nonparametric Distribution Free UCLs**											

157					95% CLT UCL	0.888				95% Jackknife UCL		0.912
158					95% Standard Bootstrap UCL	0.879				95% Bootstrap-t UCL		1.527
159					95% Hall's Bootstrap UCL	1.745				95% Percentile Bootstrap UCL		0.904
160					95% BCA Bootstrap UCL	0.957						
161					90% Chebyshev(Mean, Sd) UCL	1.015				95% Chebyshev(Mean, Sd) UCL		1.143
162					97.5% Chebyshev(Mean, Sd) UCL	1.32				99% Chebyshev(Mean, Sd) UCL		1.668
163												
164					**Suggested UCL to Use**							
165					95% Student's-t UCL	0.912				or 95% Modified-t UCL		0.925
166												
167	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
168	Recommendations are based upon data size, data distribution, and skewness.											
169	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
170	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
171												
172												
173	**Val_LEAD_212**											
174												
175					**General Statistics**							
176					Total Number of Observations	8				Number of Distinct Observations		8
177										Number of Missing Observations		0
178					Minimum	0.442				Mean		0.652
179					Maximum	0.782				Median		0.671
180					SD	0.112				Std. Error of Mean		0.0397
181					Coefficient of Variation	0.172				Skewness		-0.918
182												
183	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
184	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
185	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
186	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
187												
188					**Normal GOF Test**							
189					Shapiro Wilk Test Statistic	0.901				**Shapiro Wilk GOF Test**		
190					5% Shapiro Wilk Critical Value	0.818				Data appear Normal at 5% Significance Level		
191					Lilliefors Test Statistic	0.271				**Lilliefors GOF Test**		
192					5% Lilliefors Critical Value	0.283				Data appear Normal at 5% Significance Level		
193	**Data appear Normal at 5% Significance Level**											
194												
195					**Assuming Normal Distribution**							
196					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
197					95% Student's-t UCL	0.727				95% Adjusted-CLT UCL (Chen-1995)		0.703
198										95% Modified-t UCL (Johnson-1978)		0.725
199												
200					**Gamma GOF Test**							
201					A-D Test Statistic	0.531				**Anderson-Darling Gamma GOF Test**		
202					5% A-D Critical Value	0.716				Detected data appear Gamma Distributed at 5% Significance Level		
203					K-S Test Statistic	0.294				**Kolmogorov-Smirnov Gamma GOF Test**		
204					5% K-S Critical Value	0.294				Data Not Gamma Distributed at 5% Significance Level		
205	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
206												
207					**Gamma Statistics**							
208					k hat (MLE)	34.55				k star (bias corrected MLE)		21.68

209					Theta hat (MLE)	0.0189					Theta star (bias corrected MLE)	0.0301
210					nu hat (MLE)	552.8					nu star (bias corrected)	346.9
211					MLE Mean (bias corrected)	0.652					MLE Sd (bias corrected)	0.14
212											Approximate Chi Square Value (0.05)	304.7
213					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	294.7
214												
215	**Assuming Gamma Distribution**											
216					95% Approximate Gamma UCL (use when n>=50))	0.742					95% Adjusted Gamma UCL (use when n<50)	0.767
217												
218	**Lognormal GOF Test**											
219					Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk Lognormal GOF Test**					
220					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
221					Lilliefors Test Statistic	0.3	**Lilliefors Lognormal GOF Test**					
222					5% Lilliefors Critical Value	0.283	Data Not Lognormal at 5% Significance Level					
223	**Data appear Approximate Lognormal at 5% Significance Level**											
224												
225	**Lognormal Statistics**											
226					Minimum of Logged Data	-0.816					Mean of logged Data	-0.442
227					Maximum of Logged Data	-0.247					SD of logged Data	0.188
228												
229	**Assuming Lognormal Distribution**											
230					95% H-UCL	0.75					90% Chebyshev (MVUE) UCL	0.783
231					95% Chebyshev (MVUE) UCL	0.842					97.5% Chebyshev (MVUE) UCL	0.924
232					99% Chebyshev (MVUE) UCL	1.085						
233												
234	**Nonparametric Distribution Free UCL Statistics**											
235	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
236												
237	**Nonparametric Distribution Free UCLs**											
238					95% CLT UCL	0.717					95% Jackknife UCL	0.727
239					95% Standard Bootstrap UCL	0.714					95% Bootstrap-t UCL	0.713
240					95% Hall's Bootstrap UCL	0.705					95% Percentile Bootstrap UCL	0.71
241					95% BCA Bootstrap UCL	0.707						
242					90% Chebyshev(Mean, Sd) UCL	0.771					95% Chebyshev(Mean, Sd) UCL	0.825
243					97.5% Chebyshev(Mean, Sd) UCL	0.9					99% Chebyshev(Mean, Sd) UCL	1.047
244												
245	**Suggested UCL to Use**											
246					95% Student's-t UCL	0.727						
247												
248	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
249	Recommendations are based upon data size, data distribution, and skewness.											
250	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
251	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
252												
253	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
254	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
255												
256												
257	**Val_LEAD_214**											
258												
259	**General Statistics**											
260					Total Number of Observations	8					Number of Distinct Observations	8

261											Number of Missing Observations	0
262					Minimum	0.61					Mean	0.829
263					Maximum	1.52					Median	0.732
264					SD	0.293					Std. Error of Mean	0.104
265					Coefficient of Variation	0.353					Skewness	2.366
266												
267	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
268	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
269	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
270	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
271												
272	**Normal GOF Test**											
273					Shapiro Wilk Test Statistic	0.681	**Shapiro Wilk GOF Test**					
274					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
275					Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**					
276					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					
277	**Data Not Normal at 5% Significance Level**											
278												
279	**Assuming Normal Distribution**											
280	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
281					95% Student's-t UCL	1.025					95% Adjusted-CLT UCL (Chen-1995)	1.092
282											95% Modified-t UCL (Johnson-1978)	1.039
283												
284	**Gamma GOF Test**											
285					A-D Test Statistic	0.976	**Anderson-Darling Gamma GOF Test**					
286					5% A-D Critical Value	0.715	Data Not Gamma Distributed at 5% Significance Level					
287					K-S Test Statistic	0.338	**Kolmogorov-Smirnov Gamma GOF Test**					
288					5% K-S Critical Value	0.294	Data Not Gamma Distributed at 5% Significance Level					
289	**Data Not Gamma Distributed at 5% Significance Level**											
290												
291	**Gamma Statistics**											
292					k hat (MLE)	12.3					k star (bias corrected MLE)	7.771
293					Theta hat (MLE)	0.0674					Theta star (bias corrected MLE)	0.107
294					nu hat (MLE)	196.8					nu star (bias corrected)	124.3
295					MLE Mean (bias corrected)	0.829					MLE Sd (bias corrected)	0.297
296											Approximate Chi Square Value (0.05)	99.59
297					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	93.99
298												
299	**Assuming Gamma Distribution**											
300					95% Approximate Gamma UCL (use when n>=50))	1.035					95% Adjusted Gamma UCL (use when n<50)	1.096
301												
302	**Lognormal GOF Test**											
303					Shapiro Wilk Test Statistic	0.774	**Shapiro Wilk Lognormal GOF Test**					
304					5% Shapiro Wilk Critical Value	0.818	Data Not Lognormal at 5% Significance Level					
305					Lilliefors Test Statistic	0.32	**Lilliefors Lognormal GOF Test**					
306					5% Lilliefors Critical Value	0.283	Data Not Lognormal at 5% Significance Level					
307	**Data Not Lognormal at 5% Significance Level**											
308												
309	**Lognormal Statistics**											
310					Minimum of Logged Data	-0.494					Mean of logged Data	-0.229
311					Maximum of Logged Data	0.419					SD of logged Data	0.286
312												

313	**Assuming Lognormal Distribution**											
314				95% H-UCL	1.033			90% Chebyshev (MVUE) UCL	1.075			
315				95% Chebyshev (MVUE) UCL	1.189			97.5% Chebyshev (MVUE) UCL	1.347			
316				99% Chebyshev (MVUE) UCL	1.657							
317												
318	**Nonparametric Distribution Free UCL Statistics**											
319	**Data do not follow a Discernible Distribution (0.05)**											
320												
321	**Nonparametric Distribution Free UCLs**											
322				95% CLT UCL	0.999			95% Jackknife UCL	1.025			
323				95% Standard Bootstrap UCL	0.994			95% Bootstrap-t UCL	1.612			
324				95% Hall's Bootstrap UCL	1.956			95% Percentile Bootstrap UCL	1.011			
325				95% BCA Bootstrap UCL	1.102							
326				90% Chebyshev(Mean, Sd) UCL	1.139			95% Chebyshev(Mean, Sd) UCL	1.28			
327				97.5% Chebyshev(Mean, Sd) UCL	1.475			99% Chebyshev(Mean, Sd) UCL	1.859			
328												
329	**Suggested UCL to Use**											
330				95% Student's-t UCL	1.025			or 95% Modified-t UCL	1.039			
331												
332	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
333	Recommendations are based upon data size, data distribution, and skewness.											
334	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
335	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
336												
337												
338	**Val_POTASSIUM_40**											
339												
340	**General Statistics**											
341				Total Number of Observations	8			Number of Distinct Observations	8			
342								Number of Missing Observations	0			
343				Minimum	5.12			Mean	7.062			
344				Maximum	8.85			Median	7.425			
345				SD	1.244			Std. Error of Mean	0.44			
346				Coefficient of Variation	0.176			Skewness	-0.571			
347												
348	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
349	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
350	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
351	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
352												
353	**Normal GOF Test**											
354				Shapiro Wilk Test Statistic	0.9			**Shapiro Wilk GOF Test**				
355				5% Shapiro Wilk Critical Value	0.818			Data appear Normal at 5% Significance Level				
356				Lilliefors Test Statistic	0.224			**Lilliefors GOF Test**				
357				5% Lilliefors Critical Value	0.283			Data appear Normal at 5% Significance Level				
358	**Data appear Normal at 5% Significance Level**											
359												
360	**Assuming Normal Distribution**											
361	**95% Normal UCL**							**95% UCLs (Adjusted for Skewness)**				
362				95% Student's-t UCL	7.895			95% Adjusted-CLT UCL (Chen-1995)	7.691			
363								95% Modified-t UCL (Johnson-1978)	7.881			
364												

	A	B	C	D	E	F	G	H	I	J	K	L
365	**Gamma GOF Test**											
366					A-D Test Statistic	0.587	**Anderson-Darling Gamma GOF Test**					
367					5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level					
368					K-S Test Statistic	0.246	**Kolmogorov-Smirnov Gamma GOF Test**					
369					5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level					
370	**Detected data appear Gamma Distributed at 5% Significance Level**											
371												
372	**Gamma Statistics**											
373					k hat (MLE)	34.11	k star (bias corrected MLE)	21.4				
374					Theta hat (MLE)	0.207	Theta star (bias corrected MLE)	0.33				
375					nu hat (MLE)	545.7	nu star (bias corrected)	342.4				
376					MLE Mean (bias corrected)	7.062	MLE Sd (bias corrected)	1.527				
377							Approximate Chi Square Value (0.05)	300.5				
378					Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	290.6				
379												
380	**Assuming Gamma Distribution**											
381					95% Approximate Gamma UCL (use when n>=50))	8.046	95% Adjusted Gamma UCL (use when n<50)	8.322				
382												
383	**Lognormal GOF Test**											
384					Shapiro Wilk Test Statistic	0.87	**Shapiro Wilk Lognormal GOF Test**					
385					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
386					Lilliefors Test Statistic	0.257	**Lilliefors Lognormal GOF Test**					
387					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
388	**Data appear Lognormal at 5% Significance Level**											
389												
390	**Lognormal Statistics**											
391					Minimum of Logged Data	1.633	Mean of logged Data	1.94				
392					Maximum of Logged Data	2.18	SD of logged Data	0.187				
393												
394	**Assuming Lognormal Distribution**											
395					95% H-UCL	8.12	90% Chebyshev (MVUE) UCL	8.473				
396					95% Chebyshev (MVUE) UCL	9.111	97.5% Chebyshev (MVUE) UCL	9.995				
397					99% Chebyshev (MVUE) UCL	11.73						
398												
399	**Nonparametric Distribution Free UCL Statistics**											
400	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
401												
402	**Nonparametric Distribution Free UCLs**											
403					95% CLT UCL	7.785	95% Jackknife UCL	7.895				
404					95% Standard Bootstrap UCL	7.718	95% Bootstrap-t UCL	7.819				
405					95% Hall's Bootstrap UCL	7.711	95% Percentile Bootstrap UCL	7.721				
406					95% BCA Bootstrap UCL	7.683						
407					90% Chebyshev(Mean, Sd) UCL	8.382	95% Chebyshev(Mean, Sd) UCL	8.979				
408					97.5% Chebyshev(Mean, Sd) UCL	9.809	99% Chebyshev(Mean, Sd) UCL	11.44				
409												
410	**Suggested UCL to Use**											
411					95% Student's-t UCL	7.895						
412												
413	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
414	Recommendations are based upon data size, data distribution, and skewness.											
415	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
416	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											

417												
418	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
419	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
420												
421												
422	**Val_RADIUM_226**											
423												
424	**General Statistics**											
425					Total Number of Observations	8			Number of Distinct Observations	7		
426									Number of Missing Observations	0		
427					Minimum	1.09			Mean	1.426		
428					Maximum	2.64			Median	1.3		
429					SD	0.503			Std. Error of Mean	0.178		
430					Coefficient of Variation	0.353			Skewness	2.547		
431												
432	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
433	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
434	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
435	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
436												
437	**Normal GOF Test**											
438					Shapiro Wilk Test Statistic	0.631			**Shapiro Wilk GOF Test**			
439					5% Shapiro Wilk Critical Value	0.818			Data Not Normal at 5% Significance Level			
440					Lilliefors Test Statistic	0.356			**Lilliefors GOF Test**			
441					5% Lilliefors Critical Value	0.283			Data Not Normal at 5% Significance Level			
442	**Data Not Normal at 5% Significance Level**											
443												
444	**Assuming Normal Distribution**											
445					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
446					95% Student's-t UCL	1.763			95% Adjusted-CLT UCL (Chen-1995)	1.89		
447									95% Modified-t UCL (Johnson-1978)	1.79		
448												
449	**Gamma GOF Test**											
450					A-D Test Statistic	1.142			**Anderson-Darling Gamma GOF Test**			
451					5% A-D Critical Value	0.715			Data Not Gamma Distributed at 5% Significance Level			
452					K-S Test Statistic	0.331			**Kolmogorov-Smirnov Gamma GOF Test**			
453					5% K-S Critical Value	0.294			Data Not Gamma Distributed at 5% Significance Level			
454	**Data Not Gamma Distributed at 5% Significance Level**											
455												
456	**Gamma Statistics**											
457					k hat (MLE)	12.65			k star (bias corrected MLE)	7.989		
458					Theta hat (MLE)	0.113			Theta star (bias corrected MLE)	0.179		
459					nu hat (MLE)	202.4			nu star (bias corrected)	127.8		
460					MLE Mean (bias corrected)	1.426			MLE Sd (bias corrected)	0.505		
461									Approximate Chi Square Value (0.05)	102.7		
462					Adjusted Level of Significance	0.0195			Adjusted Chi Square Value	97.01		
463												
464	**Assuming Gamma Distribution**											
465					95% Approximate Gamma UCL (use when n>=50))	1.775			95% Adjusted Gamma UCL (use when n<50)	1.879		
466												
467	**Lognormal GOF Test**											
468					Shapiro Wilk Test Statistic	0.721			**Shapiro Wilk Lognormal GOF Test**			

469				5% Shapiro Wilk Critical Value		0.818	Data Not Lognormal at 5% Significance Level					
470				Lilliefors Test Statistic		0.314	**Lilliefors Lognormal GOF Test**					
471				5% Lilliefors Critical Value		0.283	Data Not Lognormal at 5% Significance Level					
472	**Data Not Lognormal at 5% Significance Level**											
473												
474	**Lognormal Statistics**											
475				Minimum of Logged Data		0.0862				Mean of logged Data		0.315
476				Maximum of Logged Data		0.971				SD of logged Data		0.28
477												
478	**Assuming Lognormal Distribution**											
479				95% H-UCL		1.767				90% Chebyshev (MVUE) UCL		1.841
480				95% Chebyshev (MVUE) UCL		2.032				97.5% Chebyshev (MVUE) UCL		2.298
481				99% Chebyshev (MVUE) UCL		2.82						
482												
483	**Nonparametric Distribution Free UCL Statistics**											
484	**Data do not follow a Discernible Distribution (0.05)**											
485												
486	**Nonparametric Distribution Free UCLs**											
487				95% CLT UCL		1.719				95% Jackknife UCL		1.763
488				95% Standard Bootstrap UCL		1.7				95% Bootstrap-t UCL		2.622
489				95% Hall's Bootstrap UCL		3.136				95% Percentile Bootstrap UCL		1.754
490				95% BCA Bootstrap UCL		1.826						
491				90% Chebyshev(Mean, Sd) UCL		1.96				95% Chebyshev(Mean, Sd) UCL		2.202
492				97.5% Chebyshev(Mean, Sd) UCL		2.538				99% Chebyshev(Mean, Sd) UCL		3.197
493												
494	**Suggested UCL to Use**											
495				95% Student's-t UCL		1.763				or 95% Modified-t UCL		1.79
496												
497	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
498	Recommendations are based upon data size, data distribution, and skewness.											
499	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
500	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
501												
502												
503	**Val_RADIUM_228**											
504												
505	**General Statistics**											
506				Total Number of Observations		8				Number of Distinct Observations		8
507										Number of Missing Observations		0
508				Minimum		0.504				Mean		0.66
509				Maximum		0.823				Median		0.656
510				SD		0.12				Std. Error of Mean		0.0424
511				Coefficient of Variation		0.182				Skewness		0.0445
512												
513	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
514	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
515	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
516	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
517												
518	**Normal GOF Test**											
519				Shapiro Wilk Test Statistic		0.916	**Shapiro Wilk GOF Test**					
520				5% Shapiro Wilk Critical Value		0.818	Data appear Normal at 5% Significance Level					

521				Lilliefors Test Statistic		0.15	**Lilliefors GOF Test**					
522				5% Lilliefors Critical Value		0.283	Data appear Normal at 5% Significance Level					
523	**Data appear Normal at 5% Significance Level**											
524												
525	**Assuming Normal Distribution**											
526	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
527				95% Student's-t UCL		0.74	95% Adjusted-CLT UCL (Chen-1995)					0.73
528							95% Modified-t UCL (Johnson-1978)					0.74
529												
530	**Gamma GOF Test**											
531				A-D Test Statistic		0.351	**Anderson-Darling Gamma GOF Test**					
532				5% A-D Critical Value		0.716	Detected data appear Gamma Distributed at 5% Significance Level					
533				K-S Test Statistic		0.173	**Kolmogorov-Smirnov Gamma GOF Test**					
534				5% K-S Critical Value		0.294	Detected data appear Gamma Distributed at 5% Significance Level					
535	**Detected data appear Gamma Distributed at 5% Significance Level**											
536												
537	**Gamma Statistics**											
538				k hat (MLE)		33.94	k star (bias corrected MLE)					21.3
539				Theta hat (MLE)		0.0194	Theta star (bias corrected MLE)					0.031
540				nu hat (MLE)		543.1	nu star (bias corrected)					340.8
541				MLE Mean (bias corrected)		0.66	MLE Sd (bias corrected)					0.143
542							Approximate Chi Square Value (0.05)					299
543				Adjusted Level of Significance		0.0195	Adjusted Chi Square Value					289.1
544												
545	**Assuming Gamma Distribution**											
546				95% Approximate Gamma UCL (use when n>=50))		0.752	95% Adjusted Gamma UCL (use when n<50)					0.778
547												
548	**Lognormal GOF Test**											
549				Shapiro Wilk Test Statistic		0.91	**Shapiro Wilk Lognormal GOF Test**					
550				5% Shapiro Wilk Critical Value		0.818	Data appear Lognormal at 5% Significance Level					
551				Lilliefors Test Statistic		0.162	**Lilliefors Lognormal GOF Test**					
552				5% Lilliefors Critical Value		0.283	Data appear Lognormal at 5% Significance Level					
553	**Data appear Lognormal at 5% Significance Level**											
554												
555	**Lognormal Statistics**											
556				Minimum of Logged Data		-0.685	Mean of logged Data					-0.431
557				Maximum of Logged Data		-0.195	SD of logged Data					0.185
558												
559	**Assuming Lognormal Distribution**											
560				95% H-UCL		0.757	90% Chebyshev (MVUE) UCL					0.79
561				95% Chebyshev (MVUE) UCL		0.849	97.5% Chebyshev (MVUE) UCL					0.93
562				99% Chebyshev (MVUE) UCL		1.091						
563												
564	**Nonparametric Distribution Free UCL Statistics**											
565	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
566												
567	**Nonparametric Distribution Free UCLs**											
568				95% CLT UCL		0.73	95% Jackknife UCL					0.74
569				95% Standard Bootstrap UCL		0.725	95% Bootstrap-t UCL					0.742
570				95% Hall's Bootstrap UCL		0.749	95% Percentile Bootstrap UCL					0.726
571				95% BCA Bootstrap UCL		0.726						
572				90% Chebyshev(Mean, Sd) UCL		0.787	95% Chebyshev(Mean, Sd) UCL					0.845

573					97.5% Chebyshev(Mean, Sd) UCL	0.925					99% Chebyshev(Mean, Sd) UCL	1.082
574												
575					**Suggested UCL to Use**							
576					95% Student's-t UCL	0.74						
577												
578					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
579					Recommendations are based upon data size, data distribution, and skewness.							
580					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
581					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
582												
583												
584	**Val_THALLIUM_208**											
585												
586					**General Statistics**							
587					Total Number of Observations	8					Number of Distinct Observations	8
588											Number of Missing Observations	0
589					Minimum	0.152					Mean	0.207
590					Maximum	0.257					Median	0.208
591					SD	0.0353					Std. Error of Mean	0.0125
592					Coefficient of Variation	0.17					Skewness	-0.188
593												
594					**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**							
595					**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**							
596					**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**							
597					**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**							
598												
599					**Normal GOF Test**							
600					Shapiro Wilk Test Statistic	0.945					**Shapiro Wilk GOF Test**	
601					5% Shapiro Wilk Critical Value	0.818					Data appear Normal at 5% Significance Level	
602					Lilliefors Test Statistic	0.203					**Lilliefors GOF Test**	
603					5% Lilliefors Critical Value	0.283					Data appear Normal at 5% Significance Level	
604					**Data appear Normal at 5% Significance Level**							
605												
606					**Assuming Normal Distribution**							
607					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
608					95% Student's-t UCL	0.231					95% Adjusted-CLT UCL (Chen-1995)	0.227
609											95% Modified-t UCL (Johnson-1978)	0.231
610												
611					**Gamma GOF Test**							
612					A-D Test Statistic	0.329					**Anderson-Darling Gamma GOF Test**	
613					5% A-D Critical Value	0.715					Detected data appear Gamma Distributed at 5% Significance Level	
614					K-S Test Statistic	0.222					**Kolmogorov-Smirnov Gamma GOF Test**	
615					5% K-S Critical Value	0.294					Detected data appear Gamma Distributed at 5% Significance Level	
616					**Detected data appear Gamma Distributed at 5% Significance Level**							
617												
618					**Gamma Statistics**							
619					k hat (MLE)	37.9					k star (bias corrected MLE)	23.77
620					Theta hat (MLE)	0.00546					Theta star (bias corrected MLE)	0.00871
621					nu hat (MLE)	606.4					nu star (bias corrected)	380.4
622					MLE Mean (bias corrected)	0.207					MLE Sd (bias corrected)	0.0425
623											Approximate Chi Square Value (0.05)	336.2
624					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	325.6

625												
626	**Assuming Gamma Distribution**											
627	95% Approximate Gamma UCL (use when n>=50))					0.234	95% Adjusted Gamma UCL (use when n<50)					0.242
628												
629	**Lognormal GOF Test**											
630	Shapiro Wilk Test Statistic					0.933	**Shapiro Wilk Lognormal GOF Test**					
631	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
632	Lilliefors Test Statistic					0.234	**Lilliefors Lognormal GOF Test**					
633	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
634	**Data appear Lognormal at 5% Significance Level**											
635												
636	**Lognormal Statistics**											
637	Minimum of Logged Data					-1.884	Mean of logged Data					-1.588
638	Maximum of Logged Data					-1.361	SD of logged Data					0.176
639												
640	**Assuming Lognormal Distribution**											
641	95% H-UCL					0.236	90% Chebyshev (MVUE) UCL					0.246
642	95% Chebyshev (MVUE) UCL					0.264	97.5% Chebyshev (MVUE) UCL					0.288
643	99% Chebyshev (MVUE) UCL					0.336						
644												
645	**Nonparametric Distribution Free UCL Statistics**											
646	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
647												
648	**Nonparametric Distribution Free UCLs**											
649	95% CLT UCL					0.228	95% Jackknife UCL					0.231
650	95% Standard Bootstrap UCL					0.227	95% Bootstrap-t UCL					0.231
651	95% Hall's Bootstrap UCL					0.232	95% Percentile Bootstrap UCL					0.226
652	95% BCA Bootstrap UCL					0.226						
653	90% Chebyshev(Mean, Sd) UCL					0.245	95% Chebyshev(Mean, Sd) UCL					0.261
654	97.5% Chebyshev(Mean, Sd) UCL					0.285	99% Chebyshev(Mean, Sd) UCL					0.331
655												
656	**Suggested UCL to Use**											
657	95% Student's-t UCL					0.231						
658												
659	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
660	Recommendations are based upon data size, data distribution, and skewness.											
661	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
662	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
663												
664	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
665	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
666												
667												
668	**Val_THORIUM_234**											
669												
670	**General Statistics**											
671	Total Number of Observations					8	Number of Distinct Observations					8
672							Number of Missing Observations					0
673	Minimum					0.365	Mean					0.614
674	Maximum					1.16	Median					0.575
675	SD					0.244	Std. Error of Mean					0.0863
676	Coefficient of Variation					0.398	Skewness					1.843

677												
678	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
679	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
680	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
681	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
682												
683	**Normal GOF Test**											
684					Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk GOF Test**					
685					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
686					Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**					
687					5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level					
688	**Data appear Approximate Normal at 5% Significance Level**											
689												
690	**Assuming Normal Distribution**											
691					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
692					95% Student's-t UCL	0.777			95% Adjusted-CLT UCL (Chen-1995)	0.816		
693									95% Modified-t UCL (Johnson-1978)	0.787		
694												
695	**Gamma GOF Test**											
696					A-D Test Statistic	0.435	**Anderson-Darling Gamma GOF Test**					
697					5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level					
698					K-S Test Statistic	0.213	**Kolmogorov-Smirnov Gamma GOF Test**					
699					5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level					
700	**Detected data appear Gamma Distributed at 5% Significance Level**											
701												
702	**Gamma Statistics**											
703					k hat (MLE)	8.947			k star (bias corrected MLE)	5.675		
704					Theta hat (MLE)	0.0686			Theta star (bias corrected MLE)	0.108		
705					nu hat (MLE)	143.1			nu star (bias corrected)	90.8		
706					MLE Mean (bias corrected)	0.614			MLE Sd (bias corrected)	0.258		
707									Approximate Chi Square Value (0.05)	69.83		
708					Adjusted Level of Significance	0.0195			Adjusted Chi Square Value	65.19		
709												
710	**Assuming Gamma Distribution**											
711					95% Approximate Gamma UCL (use when n>=50))	0.798			95% Adjusted Gamma UCL (use when n<50)	0.855		
712												
713	**Lognormal GOF Test**											
714					Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**					
715					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
716					Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**					
717					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
718	**Data appear Lognormal at 5% Significance Level**											
719												
720	**Lognormal Statistics**											
721					Minimum of Logged Data	-1.008			Mean of logged Data	-0.545		
722					Maximum of Logged Data	0.148			SD of logged Data	0.346		
723												
724	**Assuming Lognormal Distribution**											
725					95% H-UCL	0.812			90% Chebyshev (MVUE) UCL	0.836		
726					95% Chebyshev (MVUE) UCL	0.938			97.5% Chebyshev (MVUE) UCL	1.08		
727					99% Chebyshev (MVUE) UCL	1.359						
728												

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Nonparametric Distribution Free UCL Statistics**											
730	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
731												
732	**Nonparametric Distribution Free UCLs**											
733	95% CLT UCL					0.756		95% Jackknife UCL				0.777
734	95% Standard Bootstrap UCL					0.747		95% Bootstrap-t UCL				0.887
735	95% Hall's Bootstrap UCL					1.396		95% Percentile Bootstrap UCL				0.753
736	95% BCA Bootstrap UCL					0.807						
737	90% Chebyshev(Mean, Sd) UCL					0.873		95% Chebyshev(Mean, Sd) UCL				0.99
738	97.5% Chebyshev(Mean, Sd) UCL					1.153		99% Chebyshev(Mean, Sd) UCL				1.472
739												
740	**Suggested UCL to Use**											
741	95% Student's-t UCL					0.777						
742												
743	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
744	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
745												
746	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
747	Recommendations are based upon data size, data distribution, and skewness.											
748	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
749	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
750												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.112/1/2017 3:45:49 PM
From File	SED534-FW_Wtld-Sed=0-2_Formatted_Data_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_LEAD_210

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.46	Mean	0.742
Maximum	1.68	Median	0.567
SD	0.409	Std. Error of Mean	0.144
Coefficient of Variation	0.551	Skewness	2.131

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

Normal GOF Test

Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.262	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.016	95% Adjusted-CLT UCL (Chen-1995)	1.096
		95% Modified-t UCL (Johnson-1978)	1.034

Gamma GOF Test

A-D Test Statistic	0.7	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.254	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.298	k star (bias corrected MLE)	3.395
Theta hat (MLE)	0.14	Theta star (bias corrected MLE)	0.219
nu hat (MLE)	84.77	nu star (bias corrected)	54.32
MLE Mean (bias corrected)	0.742	MLE Sd (bias corrected)	0.403
		Approximate Chi Square Value (0.05)	38.38
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	35.02

	A	B	C	D	E	F	G	H	I	J	K	L
53	**Assuming Gamma Distribution**											
54	95% Approximate Gamma UCL (use when n>=50))					1.05	95% Adjusted Gamma UCL (use when n<50)					1.151
55												
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic					0.841	**Shapiro Wilk Lognormal GOF Test**					
58	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
59	Lilliefors Test Statistic					0.23	**Lilliefors Lognormal GOF Test**					
60	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
61	**Data appear Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data					-0.778	Mean of logged Data					-0.396
65	Maximum of Logged Data					0.519	SD of logged Data					0.438
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL					1.076	90% Chebyshev (MVUE) UCL					1.074
69	95% Chebyshev (MVUE) UCL					1.229	97.5% Chebyshev (MVUE) UCL					1.445
70	99% Chebyshev (MVUE) UCL					1.867						
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL					0.98	95% Jackknife UCL					1.016
77	95% Standard Bootstrap UCL					0.961	95% Bootstrap-t UCL					1.444
78	95% Hall's Bootstrap UCL					1.83	95% Percentile Bootstrap UCL					0.994
79	95% BCA Bootstrap UCL					1.113						
80	90% Chebyshev(Mean, Sd) UCL					1.175	95% Chebyshev(Mean, Sd) UCL					1.372
81	97.5% Chebyshev(Mean, Sd) UCL					1.644	99% Chebyshev(Mean, Sd) UCL					2.179
82												
83	**Suggested UCL to Use**											
84	95% Student's-t UCL					1.016						
85												
86	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
87	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
88												
89	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
90	Recommendations are based upon data size, data distribution, and skewness.											
91	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
92	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
93												

Estuarine Wetland Sediments

UCL Statistics for Data Sets with Non-Detects		
User Selected Options		
Date/Time of Computation	ProUCL 5.111/28/2017 2:54:58 PM	
From File	SED532-EstuarineWtld_Sed=0-2_Formatted_Data.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

Val_ALUMINUM_FUME_OR_DUST

General Statistics

Total Number of Observations	66	Number of Distinct Observations	60
		Number of Missing Observations	0
Minimum	852	Mean	12981
Maximum	27400	Median	13050
SD	6597	Std. Error of Mean	812.1
Coefficient of Variation	0.508	Skewness	-0.0353

Normal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0.0462	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.0862	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.109	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	14337	95% Adjusted-CLT UCL (Chen-1995)	14313
		95% Modified-t UCL (Johnson-1978)	14336

Gamma GOF Test

A-D Test Statistic	1.663	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.697	k star (bias corrected MLE)	2.585
Theta hat (MLE)	4813	Theta star (bias corrected MLE)	5022
nu hat (MLE)	356	nu star (bias corrected)	341.2
MLE Mean (bias corrected)	12981	MLE Sd (bias corrected)	8074
		Approximate Chi Square Value (0.05)	299.4
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	298.5

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	14794	95% Adjusted Gamma UCL (use when n<50)	14837

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.869	**Shapiro Wilk Lognormal GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
53					5% Shapiro Wilk P Value	1.1003E-7	Data Not Lognormal at 5% Significance Level					
54					Lilliefors Test Statistic	0.162	**Lilliefors Lognormal GOF Test**					
55					5% Lilliefors Critical Value	0.109	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	6.748				Mean of logged Data		9.275
60					Maximum of Logged Data	10.22				SD of logged Data		0.734
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	16805				90% Chebyshev (MVUE) UCL		18055
64					95% Chebyshev (MVUE) UCL	19944				97.5% Chebyshev (MVUE) UCL		22565
65					99% Chebyshev (MVUE) UCL	27714						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	14317				95% Jackknife UCL		14337
72					95% Standard Bootstrap UCL	14296				95% Bootstrap-t UCL		14345
73					95% Hall's Bootstrap UCL	14235				95% Percentile Bootstrap UCL		14315
74					95% BCA Bootstrap UCL	14279						
75					90% Chebyshev(Mean, Sd) UCL	15418				95% Chebyshev(Mean, Sd) UCL		16521
76					97.5% Chebyshev(Mean, Sd) UCL	18053				99% Chebyshev(Mean, Sd) UCL		21062
77												
78	**Suggested UCL to Use**											
79					95% Student's-t UCL	14337						
80												
81	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
82	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
83												
84	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
85	Recommendations are based upon data size, data distribution, and skewness.											
86	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
87	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
88												
89	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
90	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
91												
92	**Val_CADMIUM**											
93												
94	**General Statistics**											
95					Total Number of Observations	66				Number of Distinct Observations		44
96					Number of Detects	58				Number of Non-Detects		8
97					Number of Distinct Detects	37				Number of Distinct Non-Detects		8
98					Minimum Detect	0.18				Minimum Non-Detect		0.63
99					Maximum Detect	31.6				Maximum Non-Detect		3.5
100					Variance Detects	19.2				Percent Non-Detects		12.12%
101					Mean Detects	2.416				SD Detects		4.382
102					Median Detects	1.3				CV Detects		1.814
103					Skewness Detects	5.791				Kurtosis Detects		36.57
104					Mean of Logged Detects	0.449				SD of Logged Detects		0.763

105												
106	**Normal GOF Test on Detects Only**											
107					Shapiro Wilk Test Statistic	0.363	**Normal GOF Test on Detected Observations Only**					
108					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
109					Lilliefors Test Statistic	0.343	**Lilliefors GOF Test**					
110					5% Lilliefors Critical Value	0.116	Detected Data Not Normal at 5% Significance Level					
111	**Detected Data Not Normal at 5% Significance Level**											
112												
113	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
114					KM Mean	2.203	KM Standard Error of Mean	0.511				
115					KM SD	4.115	95% KM (BCA) UCL	3.183				
116					95% KM (t) UCL	3.056	95% KM (Percentile Bootstrap) UCL	3.144				
117					95% KM (z) UCL	3.044	95% KM Bootstrap t UCL	5.318				
118					90% KM Chebyshev UCL	3.737	95% KM Chebyshev UCL	4.432				
119					97.5% KM Chebyshev UCL	5.396	99% KM Chebyshev UCL	7.29				
120												
121	**Gamma GOF Tests on Detected Observations Only**											
122					A-D Test Statistic	4.514	**Anderson-Darling GOF Test**					
123					5% A-D Critical Value	0.773	Detected Data Not Gamma Distributed at 5% Significance Level					
124					K-S Test Statistic	0.189	**Kolmogorov-Smirnov GOF**					
125					5% K-S Critical Value	0.119	Detected Data Not Gamma Distributed at 5% Significance Level					
126	**Detected Data Not Gamma Distributed at 5% Significance Level**											
127												
128	**Gamma Statistics on Detected Data Only**											
129					k hat (MLE)	1.297	k star (bias corrected MLE)	1.242				
130					Theta hat (MLE)	1.862	Theta star (bias corrected MLE)	1.945				
131					nu hat (MLE)	150.5	nu star (bias corrected)	144				
132					Mean (detects)	2.416						
133												
134	**Gamma ROS Statistics using Imputed Non-Detects**											
135	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
136	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
137	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
138	This is especially true when the sample size is small.											
139	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
140					Minimum	0.01	Mean	2.137				
141					Maximum	31.6	Median	1.2				
142					SD	4.174	CV	1.953				
143					k hat (MLE)	0.706	k star (bias corrected MLE)	0.684				
144					Theta hat (MLE)	3.027	Theta star (bias corrected MLE)	3.124				
145					nu hat (MLE)	93.18	nu star (bias corrected)	90.28				
146					Adjusted Level of Significance (β)	0.0464						
147					Approximate Chi Square Value (90.28, α)	69.37	Adjusted Chi Square Value (90.28, β)	68.96				
148					95% Gamma Approximate UCL (use when n>=50)	2.781	95% Gamma Adjusted UCL (use when n<50)	2.797				
149												
150	**Estimates of Gamma Parameters using KM Estimates**											
151					Mean (KM)	2.203	SD (KM)	4.115				
152					Variance (KM)	16.93	SE of Mean (KM)	0.511				
153					k hat (KM)	0.287	k star (KM)	0.284				
154					nu hat (KM)	37.83	nu star (KM)	37.45				
155					theta hat (KM)	7.686	theta star (KM)	7.766				
156					80% gamma percentile (KM)	3.33	90% gamma percentile (KM)	6.539				

157	95% gamma percentile (KM)					10.26	99% gamma percentile (KM)					19.99
158												
159	**Gamma Kaplan-Meier (KM) Statistics**											
160	Approximate Chi Square Value (37.45, α)					24.44	Adjusted Chi Square Value (37.45, β)					24.2
161	95% Gamma Approximate KM-UCL (use when n>=50)					3.376	95% Gamma Adjusted KM-UCL (use when n<50)					3.409
162												
163	**Lognormal GOF Test on Detected Observations Only**											
164	Shapiro Wilk Approximate Test Statistic					0.906	**Shapiro Wilk GOF Test**					
165	5% Shapiro Wilk P Value					1.2954E-4	Detected Data Not Lognormal at 5% Significance Level					
166	Lilliefors Test Statistic					0.12	**Lilliefors GOF Test**					
167	5% Lilliefors Critical Value					0.116	Detected Data Not Lognormal at 5% Significance Level					
168	**Detected Data Not Lognormal at 5% Significance Level**											
169												
170	**Lognormal ROS Statistics Using Imputed Non-Detects**											
171	Mean in Original Scale					2.193	Mean in Log Scale					0.318
172	SD in Original Scale					4.149	SD in Log Scale					0.812
173	95% t UCL (assumes normality of ROS data)					3.045	95% Percentile Bootstrap UCL					3.148
174	95% BCA Bootstrap UCL					3.624	95% Bootstrap t UCL					5.267
175	95% H-UCL (Log ROS)					2.361						
176												
177	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
178	KM Mean (logged)					0.32	KM Geo Mean					1.377
179	KM SD (logged)					0.824	95% Critical H Value (KM-Log)					2.118
180	KM Standard Error of Mean (logged)					0.109	95% H-UCL (KM -Log)					2.401
181	KM SD (logged)					0.824	95% Critical H Value (KM-Log)					2.118
182	KM Standard Error of Mean (logged)					0.109						
183												
184	**DL/2 Statistics**											
185	**DL/2 Normal**						**DL/2 Log-Transformed**					
186	Mean in Original Scale					2.193	Mean in Log Scale					0.305
187	SD in Original Scale					4.151	SD in Log Scale					0.837
188	95% t UCL (Assumes normality)					3.045	95% H-Stat UCL					2.402
189	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
190												
191	**Nonparametric Distribution Free UCL Statistics**											
192	**Data do not follow a Discernible Distribution at 5% Significance Level**											
193												
194	**Suggested UCL to Use**											
195	95% KM (Chebyshev) UCL					4.432						
196												
197	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
198	Recommendations are based upon data size, data distribution, and skewness.											
199	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
200	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
201												
202												
203	**Val_MANGANESE**											
204												
205	**General Statistics**											
206	Total Number of Observations					66	Number of Distinct Observations					60
207							Number of Missing Observations					0
208	Minimum					14.6	Mean					212.2

209					Maximum	1780					Median	202
210					SD	220.2					Std. Error of Mean	27.1
211					Coefficient of Variation	1.038					Skewness	5.725
212												
213					**Normal GOF Test**							
214					Shapiro Wilk Test Statistic	0.506	**Shapiro Wilk GOF Test**					
215					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
216					Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**					
217					5% Lilliefors Critical Value	0.109	Data Not Normal at 5% Significance Level					
218					**Data Not Normal at 5% Significance Level**							
219												
220					**Assuming Normal Distribution**							
221					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
222					95% Student's-t UCL	257.4	95% Adjusted-CLT UCL (Chen-1995)					277.2
223							95% Modified-t UCL (Johnson-1978)					260.6
224												
225					**Gamma GOF Test**							
226					A-D Test Statistic	3.113	**Anderson-Darling Gamma GOF Test**					
227					5% A-D Critical Value	0.766	Data Not Gamma Distributed at 5% Significance Level					
228					K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**					
229					5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level					
230					**Data Not Gamma Distributed at 5% Significance Level**							
231												
232					**Gamma Statistics**							
233					k hat (MLE)	1.777	k star (bias corrected MLE)					1.707
234					Theta hat (MLE)	119.4	Theta star (bias corrected MLE)					124.3
235					nu hat (MLE)	234.6	nu star (bias corrected)					225.3
236					MLE Mean (bias corrected)	212.2	MLE Sd (bias corrected)					162.4
237							Approximate Chi Square Value (0.05)					191.5
238					Adjusted Level of Significance	0.0464	Adjusted Chi Square Value					190.9
239												
240					**Assuming Gamma Distribution**							
241					95% Approximate Gamma UCL (use when n>=50))	249.6	95% Adjusted Gamma UCL (use when n<50)					250.5
242												
243					**Lognormal GOF Test**							
244					Shapiro Wilk Test Statistic	0.859	**Shapiro Wilk Lognormal GOF Test**					
245					5% Shapiro Wilk P Value	2.6684E-8	Data Not Lognormal at 5% Significance Level					
246					Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**					
247					5% Lilliefors Critical Value	0.109	Data Not Lognormal at 5% Significance Level					
248					**Data Not Lognormal at 5% Significance Level**							
249												
250					**Lognormal Statistics**							
251					Minimum of Logged Data	2.681	Mean of logged Data					5.05
252					Maximum of Logged Data	7.484	SD of logged Data					0.85
253												
254					**Assuming Lognormal Distribution**							
255					95% H-UCL	280.7	90% Chebyshev (MVUE) UCL					301.9
256					95% Chebyshev (MVUE) UCL	338	97.5% Chebyshev (MVUE) UCL					388
257					99% Chebyshev (MVUE) UCL	486.3						
258												
259					**Nonparametric Distribution Free UCL Statistics**							
260					**Data do not follow a Discernible Distribution (0.05)**							

261												
262	**Nonparametric Distribution Free UCLs**											
263					95% CLT UCL	256.8			95% Jackknife UCL	257.4		
264					95% Standard Bootstrap UCL	256.2			95% Bootstrap-t UCL	298.6		
265					95% Hall's Bootstrap UCL	458.9			95% Percentile Bootstrap UCL	264.1		
266					95% BCA Bootstrap UCL	282.2						
267					90% Chebyshev(Mean, Sd) UCL	293.5			95% Chebyshev(Mean, Sd) UCL	330.3		
268					97.5% Chebyshev(Mean, Sd) UCL	381.4			99% Chebyshev(Mean, Sd) UCL	481.9		
269												
270	**Suggested UCL to Use**											
271					95% Chebyshev (Mean, Sd) UCL	330.3						
272												
273	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
274	Recommendations are based upon data size, data distribution, and skewness.											
275	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
276	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
277												
278	**Val_MERCURY**											
279												
280	**General Statistics**											
281					Total Number of Observations	66			Number of Distinct Observations	54		
282									Number of Missing Observations	0		
283					Minimum	0.05			Mean	2.586		
284					Maximum	100			Median	0.523		
285					SD	12.26			Std. Error of Mean	1.509		
286					Coefficient of Variation	4.74			Skewness	7.959		
287												
288	**Normal GOF Test**											
289					Shapiro Wilk Test Statistic	0.189			**Shapiro Wilk GOF Test**			
290					5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
291					Lilliefors Test Statistic	0.418			**Lilliefors GOF Test**			
292					5% Lilliefors Critical Value	0.109			Data Not Normal at 5% Significance Level			
293	**Data Not Normal at 5% Significance Level**											
294												
295	**Assuming Normal Distribution**											
296					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
297					95% Student's-t UCL	5.104			95% Adjusted-CLT UCL (Chen-1995)	6.648		
298									95% Modified-t UCL (Johnson-1978)	5.35		
299												
300	**Gamma GOF Test**											
301					A-D Test Statistic	7.519			**Anderson-Darling Gamma GOF Test**			
302					5% A-D Critical Value	0.826			Data Not Gamma Distributed at 5% Significance Level			
303					K-S Test Statistic	0.266			**Kolmogorov-Smirnov Gamma GOF Test**			
304					5% K-S Critical Value	0.117			Data Not Gamma Distributed at 5% Significance Level			
305	**Data Not Gamma Distributed at 5% Significance Level**											
306												
307	**Gamma Statistics**											
308					k hat (MLE)	0.459			k star (bias corrected MLE)	0.449		
309					Theta hat (MLE)	5.628			Theta star (bias corrected MLE)	5.764		
310					nu hat (MLE)	60.65			nu star (bias corrected)	59.23		
311					MLE Mean (bias corrected)	2.586			MLE Sd (bias corrected)	3.861		
312									Approximate Chi Square Value (0.05)	42.53		

313	Adjusted Level of Significance					0.0464	Adjusted Chi Square Value					42.22
314												
315	**Assuming Gamma Distribution**											
316	95% Approximate Gamma UCL (use when n>=50))					3.601	95% Adjusted Gamma UCL (use when n<50)					3.628
317												
318	**Lognormal GOF Test**											
319	Shapiro Wilk Test Statistic					0.945	**Shapiro Wilk Lognormal GOF Test**					
320	5% Shapiro Wilk P Value					0.0102	Data Not Lognormal at 5% Significance Level					
321	Lilliefors Test Statistic					0.131	**Lilliefors Lognormal GOF Test**					
322	5% Lilliefors Critical Value					0.109	Data Not Lognormal at 5% Significance Level					
323	**Data Not Lognormal at 5% Significance Level**											
324												
325	**Lognormal Statistics**											
326	Minimum of Logged Data					-2.996	Mean of logged Data					-0.451
327	Maximum of Logged Data					4.605	SD of logged Data					1.256
328												
329	**Assuming Lognormal Distribution**											
330	95% H-UCL					1.963	90% Chebyshev (MVUE) UCL					2.184
331	95% Chebyshev (MVUE) UCL					2.55	97.5% Chebyshev (MVUE) UCL					3.06
332	99% Chebyshev (MVUE) UCL					4.06						
333												
334	**Nonparametric Distribution Free UCL Statistics**											
335	**Data do not follow a Discernible Distribution (0.05)**											
336												
337	**Nonparametric Distribution Free UCLs**											
338	95% CLT UCL					5.068	95% Jackknife UCL					5.104
339	95% Standard Bootstrap UCL					5.106	95% Bootstrap-t UCL					20.62
340	95% Hall's Bootstrap UCL					14.01	95% Percentile Bootstrap UCL					5.554
341	95% BCA Bootstrap UCL					7.31						
342	90% Chebyshev(Mean, Sd) UCL					7.113	95% Chebyshev(Mean, Sd) UCL					9.163
343	97.5% Chebyshev(Mean, Sd) UCL					12.01	99% Chebyshev(Mean, Sd) UCL					17.6
344												
345	**Suggested UCL to Use**											
346	95% Chebyshev (Mean, Sd) UCL					9.163						
347												
348	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
349	Recommendations are based upon data size, data distribution, and skewness.											
350	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
351	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
352												

1	**UCL Statistics for Data Sets with Non-Detects**										
2											
3	User Selected Options										
4	Date/Time of Computation	ProUCL 5.111/14/2017 7:17:20 PM									
5	From File	SED532-EstuarineWtld_Sed=0-2_Formatted_Data.xls									
6	Full Precision	OFF									
7	Confidence Coefficient	95%									
8	Number of Bootstrap Operations	2000									
9											
10	**Val_BENZOAANTHRACENE**										
11											
12	**General Statistics**										
13	Total Number of Observations	65			Number of Distinct Observations	40					
14	Number of Detects	13			Number of Non-Detects	52					
15	Number of Distinct Detects	13			Number of Distinct Non-Detects	29					
16	Minimum Detect	0.049			Minimum Non-Detect	0.21					
17	Maximum Detect	24			Maximum Non-Detect	0.8					
18	Variance Detects	45.6			Percent Non-Detects	80%					
19	Mean Detects	3.596			SD Detects	6.753					
20	Median Detects	0.68			CV Detects	1.878					
21	Skewness Detects	2.724			Kurtosis Detects	7.762					
22	Mean of Logged Detects	-0.176			SD of Logged Detects	1.858					
23											
24	**Normal GOF Test on Detects Only**										
25	Shapiro Wilk Test Statistic	0.584			**Shapiro Wilk GOF Test**						
26	5% Shapiro Wilk Critical Value	0.866			Detected Data Not Normal at 5% Significance Level						
27	Lilliefors Test Statistic	0.346			**Lilliefors GOF Test**						
28	5% Lilliefors Critical Value	0.234			Detected Data Not Normal at 5% Significance Level						
29	**Detected Data Not Normal at 5% Significance Level**										
30											
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**										
32	KM Mean	0.832			KM Standard Error of Mean	0.416					
33	KM SD	3.214			95% KM (BCA) UCL	1.668					
34	95% KM (t) UCL	1.526			95% KM (Percentile Bootstrap) UCL	1.579					
35	95% KM (z) UCL	1.516			95% KM Bootstrap t UCL	3.702					
36	90% KM Chebyshev UCL	2.079			95% KM Chebyshev UCL	2.644					
37	97.5% KM Chebyshev UCL	3.427			99% KM Chebyshev UCL	4.967					
38											
39	**Gamma GOF Tests on Detected Observations Only**										
40	A-D Test Statistic	0.624			**Anderson-Darling GOF Test**						
41	5% A-D Critical Value	0.801			Detected data appear Gamma Distributed at 5% Significance Level						
42	K-S Test Statistic	0.22			**Kolmogorov-Smirnov GOF**						
43	5% K-S Critical Value	0.252			Detected data appear Gamma Distributed at 5% Significance Level						
44	**Detected data appear Gamma Distributed at 5% Significance Level**										
45											
46	**Gamma Statistics on Detected Data Only**										
47	k hat (MLE)	0.445			k star (bias corrected MLE)	0.393					
48	Theta hat (MLE)	8.087			Theta star (bias corrected MLE)	9.143					
49	nu hat (MLE)	11.56			nu star (bias corrected)	10.23					
50	Mean (detects)	3.596									
51											
52	**Gamma ROS Statistics using Imputed Non-Detects**										

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean		0.727
59					Maximum	24				Median		0.01
60					SD	3.262				CV		4.486
61					k hat (MLE)	0.214				k star (bias corrected MLE)		0.214
62					Theta hat (MLE)	3.396				Theta star (bias corrected MLE)		3.39
63					nu hat (MLE)	27.83				nu star (bias corrected)		27.88
64					Adjusted Level of Significance (β)	0.0463						
65					Approximate Chi Square Value (27.88, α)	16.84				Adjusted Chi Square Value (27.88, β)		16.64
66					95% Gamma Approximate UCL (use when n>=50)	1.204				95% Gamma Adjusted UCL (use when n<50)		1.218
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	0.832				SD (KM)		3.214
70					Variance (KM)	10.33				SE of Mean (KM)		0.416
71					k hat (KM)	0.067				k star (KM)		0.0742
72					nu hat (KM)	8.709				nu star (KM)		9.641
73					theta hat (KM)	12.42				theta star (KM)		11.22
74					80% gamma percentile (KM)	0.339				90% gamma percentile (KM)		1.875
75					95% gamma percentile (KM)	4.814				99% gamma percentile (KM)		15.27
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (9.64, α)	3.718				Adjusted Chi Square Value (9.64, β)		3.635
79					95% Gamma Approximate KM-UCL (use when n>=50)	2.157				95% Gamma Adjusted KM-UCL (use when n<50)		2.206
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.965				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.866				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.126				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.234				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	0.827				Mean in Log Scale		-1.817
90					SD in Original Scale	3.241				SD in Log Scale		1.312
91					95% t UCL (assumes normality of ROS data)	1.498				95% Percentile Bootstrap UCL		1.574
92					95% BCA Bootstrap UCL	2.083				95% Bootstrap t UCL		3.502
93					95% H-UCL (Log ROS)	0.552						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	-1.713				KM Geo Mean		0.18
97					KM SD (logged)	1.216				95% Critical H Value (KM-Log)		2.211
98					KM Standard Error of Mean (logged)	0.268				95% H-UCL (KM -Log)		0.529
99					KM SD (logged)	1.216				95% Critical H Value (KM-Log)		2.211
100					KM Standard Error of Mean (logged)	0.268						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	0.893				Mean in Log Scale		-1.302

105					SD in Original Scale	3.226					SD in Log Scale	1.035
106					95% t UCL (Assumes normality)	1.561					95% H-Stat UCL	0.622
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Gamma Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM Approximate Gamma UCL	2.157						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120	**Val_BENZOAPYRENE**											
121												
122	**General Statistics**											
123					Total Number of Observations	65					Number of Distinct Observations	40
124					Number of Detects	11					Number of Non-Detects	54
125					Number of Distinct Detects	11					Number of Distinct Non-Detects	30
126					Minimum Detect	0.093					Minimum Non-Detect	0.21
127					Maximum Detect	20					Maximum Non-Detect	0.8
128					Variance Detects	33.52					Percent Non-Detects	83.08%
129					Mean Detects	3.111					SD Detects	5.789
130					Median Detects	0.79					CV Detects	1.861
131					Skewness Detects	2.958					Kurtosis Detects	9.168
132					Mean of Logged Detects	-1.833E-4					SD of Logged Detects	1.596
133												
134	**Normal GOF Test on Detects Only**											
135					Shapiro Wilk Test Statistic	0.555					**Shapiro Wilk GOF Test**	
136					5% Shapiro Wilk Critical Value	0.85					Detected Data Not Normal at 5% Significance Level	
137					Lilliefors Test Statistic	0.319					**Lilliefors GOF Test**	
138					5% Lilliefors Critical Value	0.251					Detected Data Not Normal at 5% Significance Level	
139	**Detected Data Not Normal at 5% Significance Level**											
140												
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
142					KM Mean	0.643					KM Standard Error of Mean	0.33
143					KM SD	2.53					95% KM (BCA) UCL	1.255
144					95% KM (t) UCL	1.194					95% KM (Percentile Bootstrap) UCL	1.243
145					95% KM (z) UCL	1.186					95% KM Bootstrap t UCL	2.813
146					90% KM Chebyshev UCL	1.633					95% KM Chebyshev UCL	2.081
147					97.5% KM Chebyshev UCL	2.703					99% KM Chebyshev UCL	3.925
148												
149	**Gamma GOF Tests on Detected Observations Only**											
150					A-D Test Statistic	0.487					**Anderson-Darling GOF Test**	
151					5% A-D Critical Value	0.777					Detected data appear Gamma Distributed at 5% Significance Level	
152					K-S Test Statistic	0.183					**Kolmogorov-Smirnov GOF**	
153					5% K-S Critical Value	0.268					Detected data appear Gamma Distributed at 5% Significance Level	
154	**Detected data appear Gamma Distributed at 5% Significance Level**											
155												
156	**Gamma Statistics on Detected Data Only**											

	A	B	C	D	E	F	G	H	I	J	K	L
157					k hat (MLE)	0.551				k star (bias corrected MLE)		0.462
158					Theta hat (MLE)	5.644				Theta star (bias corrected MLE)		6.741
159					nu hat (MLE)	12.13				nu star (bias corrected)		10.15
160					Mean (detects)	3.111						
161												
162	**Gamma ROS Statistics using Imputed Non-Detects**											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168					Minimum	0.01				Mean		0.535
169					Maximum	20				Median		0.01
170					SD	2.571				CV		4.807
171					k hat (MLE)	0.226				k star (bias corrected MLE)		0.225
172					Theta hat (MLE)	2.37				Theta star (bias corrected MLE)		2.372
173					nu hat (MLE)	29.33				nu star (bias corrected)		29.31
174					Adjusted Level of Significance (β)	0.0463						
175					Approximate Chi Square Value (29.31, α)	17.95				Adjusted Chi Square Value (29.31, β)		17.75
176					95% Gamma Approximate UCL (use when n>=50)	0.873				95% Gamma Adjusted UCL (use when n<50)		0.883
177												
178	**Estimates of Gamma Parameters using KM Estimates**											
179					Mean (KM)	0.643				SD (KM)		2.53
180					Variance (KM)	6.4				SE of Mean (KM)		0.33
181					k hat (KM)	0.0646				k star (KM)		0.0719
182					nu hat (KM)	8.402				nu star (KM)		9.347
183					theta hat (KM)	9.951				theta star (KM)		8.945
184					80% gamma percentile (KM)	0.245				90% gamma percentile (KM)		1.417
185					95% gamma percentile (KM)	3.71				99% gamma percentile (KM)		11.97
186												
187	**Gamma Kaplan-Meier (KM) Statistics**											
188					Approximate Chi Square Value (9.35, α)	3.538				Adjusted Chi Square Value (9.35, β)		3.457
189					95% Gamma Approximate KM-UCL (use when n>=50)	1.699				95% Gamma Adjusted KM-UCL (use when n<50)		1.739
190												
191	**Lognormal GOF Test on Detected Observations Only**											
192					Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**					
193					5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level					
194					Lilliefors Test Statistic	0.111	**Lilliefors GOF Test**					
195					5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level					
196	**Detected Data appear Lognormal at 5% Significance Level**											
197												
198	**Lognormal ROS Statistics Using Imputed Non-Detects**											
199					Mean in Original Scale	0.621				Mean in Log Scale		-1.985
200					SD in Original Scale	2.554				SD in Log Scale		1.269
201					95% t UCL (assumes normality of ROS data)	1.15				95% Percentile Bootstrap UCL		1.218
202					95% BCA Bootstrap UCL	1.617				95% Bootstrap t UCL		2.786
203					95% H-UCL (Log ROS)	0.435						
204												
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
206					KM Mean (logged)	-1.685				KM Geo Mean		0.185
207					KM SD (logged)	1.034				95% Critical H Value (KM-Log)		2.263
208					KM Standard Error of Mean (logged)	0.211				95% H-UCL (KM -Log)		0.424

209	KM SD (logged)					1.034	95% Critical H Value (KM-Log)					2.263
210	KM Standard Error of Mean (logged)					0.211						
211												
212	**DL/2 Statistics**											
213	**DL/2 Normal**						**DL/2 Log-Transformed**					
214	Mean in Original Scale					0.707	Mean in Log Scale					-1.319
215	SD in Original Scale					2.537	SD in Log Scale					0.928
216	95% t UCL (Assumes normality)					1.232	95% H-Stat UCL					0.531
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Detected Data appear Gamma Distributed at 5% Significance Level**											
221												
222	**Suggested UCL to Use**											
223	95% KM Approximate Gamma UCL					1.699						
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness.											
227	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
228	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
229												
230	**Val_BENZOBFLUORANTHENE**											
231												
232	**General Statistics**											
233	Total Number of Observations					65	Number of Distinct Observations					37
234	Number of Detects					14	Number of Non-Detects					51
235	Number of Distinct Detects					13	Number of Distinct Non-Detects					28
236	Minimum Detect					0.13	Minimum Non-Detect					0.21
237	Maximum Detect					19	Maximum Non-Detect					0.8
238	Variance Detects					25.47	Percent Non-Detects					78.46%
239	Mean Detects					2.72	SD Detects					5.047
240	Median Detects					0.613	CV Detects					1.856
241	Skewness Detects					2.986	Kurtosis Detects					9.523
242	Mean of Logged Detects					-0.116	SD of Logged Detects					1.496
243												
244	**Normal GOF Test on Detects Only**											
245	Shapiro Wilk Test Statistic					0.558	**Shapiro Wilk GOF Test**					
246	5% Shapiro Wilk Critical Value					0.874	Detected Data Not Normal at 5% Significance Level					
247	Lilliefors Test Statistic					0.351	**Lilliefors GOF Test**					
248	5% Lilliefors Critical Value					0.226	Detected Data Not Normal at 5% Significance Level					
249	**Detected Data Not Normal at 5% Significance Level**											
250												
251	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
252	KM Mean					0.734	KM Standard Error of Mean					0.321
253	KM SD					2.486	95% KM (BCA) UCL					1.417
254	95% KM (t) UCL					1.269	95% KM (Percentile Bootstrap) UCL					1.325
255	95% KM (z) UCL					1.261	95% KM Bootstrap t UCL					2.79
256	90% KM Chebyshev UCL					1.696	95% KM Chebyshev UCL					2.131
257	97.5% KM Chebyshev UCL					2.736	99% KM Chebyshev UCL					3.923
258												
259	**Gamma GOF Tests on Detected Observations Only**											
260	A-D Test Statistic					0.881	**Anderson-Darling GOF Test**					

261				5% A-D Critical Value	0.788	Detected Data Not Gamma Distributed at 5% Significance Level						
262				K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**						
263				5% K-S Critical Value	0.241	Detected data appear Gamma Distributed at 5% Significance Level						
264	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
265												
266	**Gamma Statistics on Detected Data Only**											
267				k hat (MLE)	0.559	k star (bias corrected MLE)	0.487					
268				Theta hat (MLE)	4.863	Theta star (bias corrected MLE)	5.584					
269				nu hat (MLE)	15.66	nu star (bias corrected)	13.64					
270				Mean (detects)	2.72							
271												
272	**Gamma ROS Statistics using Imputed Non-Detects**											
273	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
274	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
275	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
276	This is especially true when the sample size is small.											
277	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
278				Minimum	0.01	Mean	0.594					
279				Maximum	19	Median	0.01					
280				SD	2.536	CV	4.273					
281				k hat (MLE)	0.231	k star (bias corrected MLE)	0.23					
282				Theta hat (MLE)	2.572	Theta star (bias corrected MLE)	2.576					
283				nu hat (MLE)	30.01	nu star (bias corrected)	29.96					
284				Adjusted Level of Significance (β)	0.0463							
285				Approximate Chi Square Value (29.96, α)	18.46	Adjusted Chi Square Value (29.96, β)	18.25					
286				95% Gamma Approximate UCL (use when n>=50)	0.963	95% Gamma Adjusted UCL (use when n<50)	0.974					
287												
288	**Estimates of Gamma Parameters using KM Estimates**											
289				Mean (KM)	0.734	SD (KM)	2.486					
290				Variance (KM)	6.18	SE of Mean (KM)	0.321					
291				k hat (KM)	0.0872	k star (KM)	0.0934					
292				nu hat (KM)	11.33	nu star (KM)	12.14					
293				theta hat (KM)	8.419	theta star (KM)	7.858					
294				80% gamma percentile (KM)	0.459	90% gamma percentile (KM)	1.895					
295				95% gamma percentile (KM)	4.273	99% gamma percentile (KM)	12.06					
296												
297	**Gamma Kaplan-Meier (KM) Statistics**											
298				Approximate Chi Square Value (12.14, α)	5.321	Adjusted Chi Square Value (12.14, β)	5.219					
299				95% Gamma Approximate KM-UCL (use when n>=50)	1.675	95% Gamma Adjusted KM-UCL (use when n<50)	1.708					
300												
301	**Lognormal GOF Test on Detected Observations Only**											
302				Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**						
303				5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level						
304				Lilliefors Test Statistic	0.144	**Lilliefors GOF Test**						
305				5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level						
306	**Detected Data appear Lognormal at 5% Significance Level**											
307												
308	**Lognormal ROS Statistics Using Imputed Non-Detects**											
309				Mean in Original Scale	0.691	Mean in Log Scale	-1.754					
310				SD in Original Scale	2.515	SD in Log Scale	1.238					
311				95% t UCL (assumes normality of ROS data)	1.212	95% Percentile Bootstrap UCL	1.239					
312				95% BCA Bootstrap UCL	1.557	95% Bootstrap t UCL	2.579					

313					95% H-UCL (Log ROS)	0.523						
314												
315	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
316					KM Mean (logged)	-1.37				KM Geo Mean		0.254
317					KM SD (logged)	0.974				95% Critical H Value (KM-Log)		2.238
318					KM Standard Error of Mean (logged)	0.165				95% H-UCL (KM -Log)		0.536
319					KM SD (logged)	0.974				95% Critical H Value (KM-Log)		2.238
320					KM Standard Error of Mean (logged)	0.165						
321												
322	**DL/2 Statistics**											
323	**DL/2 Normal**						**DL/2 Log-Transformed**					
324					Mean in Original Scale	0.753				Mean in Log Scale		-1.284
325					SD in Original Scale	2.501				SD in Log Scale		0.966
326					95% t UCL (Assumes normality)	1.271				95% H-Stat UCL		0.578
327	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
328												
329	**Nonparametric Distribution Free UCL Statistics**											
330	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**											
331												
332	**Suggested UCL to Use**											
333					95% KM Approximate Gamma UCL	1.675						
334												
335	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
336	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
337												
338	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
339	Recommendations are based upon data size, data distribution, and skewness.											
340	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
341	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
342												
343	**Val_AROCLOR_1254**											
344												
345	**General Statistics**											
346					Total Number of Observations	65				Number of Distinct Observations		42
347					Number of Detects	8				Number of Non-Detects		57
348					Number of Distinct Detects	8				Number of Distinct Non-Detects		34
349					Minimum Detect	0.024				Minimum Non-Detect		0.041
350					Maximum Detect	14				Maximum Non-Detect		0.16
351					Variance Detects	22.85				Percent Non-Detects		87.69%
352					Mean Detects	2.248				SD Detects		4.78
353					Median Detects	0.5				CV Detects		2.126
354					Skewness Detects	2.758				Kurtosis Detects		7.684
355					Mean of Logged Detects	-0.72				SD of Logged Detects		1.919
356												
357	**Normal GOF Test on Detects Only**											
358					Shapiro Wilk Test Statistic	0.511	**Shapiro Wilk GOF Test**					
359					5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level					
360					Lilliefors Test Statistic	0.412	**Lilliefors GOF Test**					
361					5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level					
362	**Detected Data Not Normal at 5% Significance Level**											
363												
364	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											

	A	B	C	D	E	F	G	H	I	J	K	L
365					KM Mean	0.299				KM Standard Error of Mean		0.229
366					KM SD	1.73				95% KM (BCA) UCL		0.747
367					95% KM (t) UCL	0.682				95% KM (Percentile Bootstrap) UCL		0.727
368					95% KM (z) UCL	0.676				95% KM Bootstrap t UCL		3.688
369					90% KM Chebyshev UCL	0.987				95% KM Chebyshev UCL		1.299
370					97.5% KM Chebyshev UCL	1.732				99% KM Chebyshev UCL		2.582
371												
372					**Gamma GOF Tests on Detected Observations Only**							
373					A-D Test Statistic	0.709	**Anderson-Darling GOF Test**					
374					5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level					
375					K-S Test Statistic	0.309	**Kolmogorov-Smirnov GOF**					
376					5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level					
377					**Detected data appear Gamma Distributed at 5% Significance Level**							
378												
379					**Gamma Statistics on Detected Data Only**							
380					k hat (MLE)	0.426				k star (bias corrected MLE)		0.349
381					Theta hat (MLE)	5.28				Theta star (bias corrected MLE)		6.434
382					nu hat (MLE)	6.813				nu star (bias corrected)		5.591
383					Mean (detects)	2.248						
384												
385					**Gamma ROS Statistics using Imputed Non-Detects**							
386					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
387					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
388					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
389					This is especially true when the sample size is small.							
390					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
391					Minimum	0.01				Mean		0.285
392					Maximum	14				Median		0.01
393					SD	1.746				CV		6.115
394					k hat (MLE)	0.248				k star (bias corrected MLE)		0.246
395					Theta hat (MLE)	1.153				Theta star (bias corrected MLE)		1.159
396					nu hat (MLE)	32.19				nu star (bias corrected)		32.03
397					Adjusted Level of Significance (β)	0.0463						
398					Approximate Chi Square Value (32.03, α)	20.1				Adjusted Chi Square Value (32.03, β)		19.88
399					95% Gamma Approximate UCL (use when n>=50)	0.455				95% Gamma Adjusted UCL (use when n<50)		0.46
400												
401					**Estimates of Gamma Parameters using KM Estimates**							
402					Mean (KM)	0.299				SD (KM)		1.73
403					Variance (KM)	2.994				SE of Mean (KM)		0.229
404					k hat (KM)	0.0299				k star (KM)		0.0388
405					nu hat (KM)	3.885				nu star (KM)		5.039
406					theta hat (KM)	10.01				theta star (KM)		7.717
407					80% gamma percentile (KM)	0.0142				90% gamma percentile (KM)		0.306
408					95% gamma percentile (KM)	1.408				99% gamma percentile (KM)		7.145
409												
410					**Gamma Kaplan-Meier (KM) Statistics**							
411					Approximate Chi Square Value (5.04, α)	1.17				Adjusted Chi Square Value (5.04, β)		1.129
412					95% Gamma Approximate KM-UCL (use when n>=50)	1.288				95% Gamma Adjusted KM-UCL (use when n<50)		1.334
413												
414					**Lognormal GOF Test on Detected Observations Only**							
415					Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**					
416					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					

417					Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**					
418					5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level					
419	**Detected Data appear Lognormal at 5% Significance Level**											
420												
421	**Lognormal ROS Statistics Using Imputed Non-Detects**											
422					Mean in Original Scale	0.292				Mean in Log Scale	-4.015	
423					SD in Original Scale	1.745				SD in Log Scale	1.658	
424					95% t UCL (assumes normality of ROS data)	0.653				95% Percentile Bootstrap UCL	0.724	
425					95% BCA Bootstrap UCL	1.115				95% Bootstrap t UCL	4.089	
426					95% H-UCL (Log ROS)	0.123						
427												
428	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
429					KM Mean (logged)	-3.329				KM Geo Mean	0.0358	
430					KM SD (logged)	1.177				95% Critical H Value (KM-Log)	2.238	
431					KM Standard Error of Mean (logged)	0.161				95% H-UCL (KM -Log)	0.0995	
432					KM SD (logged)	1.177				95% Critical H Value (KM-Log)	2.238	
433					KM Standard Error of Mean (logged)	0.161						
434												
435	**DL/2 Statistics**											
436	**DL/2 Normal**						**DL/2 Log-Transformed**					
437					Mean in Original Scale	0.313				Mean in Log Scale	-2.924	
438					SD in Original Scale	1.741				SD in Log Scale	1.09	
439					95% t UCL (Assumes normality)	0.674				95% H-Stat UCL	0.133	
440	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
441												
442	**Nonparametric Distribution Free UCL Statistics**											
443	**Detected Data appear Gamma Distributed at 5% Significance Level**											
444												
445	**Suggested UCL to Use**											
446					95% KM Approximate Gamma UCL	1.288						
447												
448	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
449	Recommendations are based upon data size, data distribution, and skewness.											
450	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
451	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
452												
453	**Val_AROCLOR_1260**											
454												
455	**General Statistics**											
456					Total Number of Observations	66				Number of Distinct Observations	43	
457					Number of Detects	14				Number of Non-Detects	52	
458					Number of Distinct Detects	12				Number of Distinct Non-Detects	31	
459					Minimum Detect	0.032				Minimum Non-Detect	0.04	
460					Maximum Detect	16				Maximum Non-Detect	0.16	
461					Variance Detects	23.11				Percent Non-Detects	78.79%	
462					Mean Detects	2.794				SD Detects	4.807	
463					Median Detects	0.46				CV Detects	1.721	
464					Skewness Detects	2.186				Kurtosis Detects	4.263	
465					Mean of Logged Detects	-0.781				SD of Logged Detects	2.267	
466												
467	**Normal GOF Test on Detects Only**											
468					Shapiro Wilk Test Statistic	0.642	**Shapiro Wilk GOF Test**					

469	5% Shapiro Wilk Critical Value					0.874	Detected Data Not Normal at 5% Significance Level					
470	Lilliefors Test Statistic					0.283	**Lilliefors GOF Test**					
471	5% Lilliefors Critical Value					0.226	Detected Data Not Normal at 5% Significance Level					
472	**Detected Data Not Normal at 5% Significance Level**											
473												
474	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
475	KM Mean					0.623	KM Standard Error of Mean					0.308
476	KM SD					2.412	95% KM (BCA) UCL					1.167
477	95% KM (t) UCL					1.137	95% KM (Percentile Bootstrap) UCL					1.163
478	95% KM (z) UCL					1.13	95% KM Bootstrap t UCL					2.289
479	90% KM Chebyshev UCL					1.548	95% KM Chebyshev UCL					1.966
480	97.5% KM Chebyshev UCL					2.548	99% KM Chebyshev UCL					3.689
481												
482	**Gamma GOF Tests on Detected Observations Only**											
483	A-D Test Statistic					0.728	**Anderson-Darling GOF Test**					
484	5% A-D Critical Value					0.819	Detected data appear Gamma Distributed at 5% Significance Level					
485	K-S Test Statistic					0.222	**Kolmogorov-Smirnov GOF**					
486	5% K-S Critical Value					0.246	Detected data appear Gamma Distributed at 5% Significance Level					
487	**Detected data appear Gamma Distributed at 5% Significance Level**											
488												
489	**Gamma Statistics on Detected Data Only**											
490	k hat (MLE)					0.369	k star (bias corrected MLE)					0.337
491	Theta hat (MLE)					7.579	Theta star (bias corrected MLE)					8.284
492	nu hat (MLE)					10.32	nu star (bias corrected)					9.443
493	Mean (detects)					2.794						
494												
495	**Gamma ROS Statistics using Imputed Non-Detects**											
496	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
497	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
498	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
499	This is especially true when the sample size is small.											
500	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
501	Minimum					0.01	Mean					0.601
502	Maximum					16	Median					0.01
503	SD					2.436	CV					4.057
504	k hat (MLE)					0.221	k star (bias corrected MLE)					0.221
505	Theta hat (MLE)					2.722	Theta star (bias corrected MLE)					2.721
506	nu hat (MLE)					29.13	nu star (bias corrected)					29.13
507	Adjusted Level of Significance (β)					0.0464						
508	Approximate Chi Square Value (29.13, α)					17.81	Adjusted Chi Square Value (29.13, β)					17.62
509	95% Gamma Approximate UCL (use when n>=50)					0.982	95% Gamma Adjusted UCL (use when n<50)					0.993
510												
511	**Estimates of Gamma Parameters using KM Estimates**											
512	Mean (KM)					0.623	SD (KM)					2.412
513	Variance (KM)					5.82	SE of Mean (KM)					0.308
514	k hat (KM)					0.0667	k star (KM)					0.0738
515	nu hat (KM)					8.806	nu star (KM)					9.739
516	theta hat (KM)					9.34	theta star (KM)					8.445
517	80% gamma percentile (KM)					0.251	90% gamma percentile (KM)					1.399
518	95% gamma percentile (KM)					3.604	99% gamma percentile (KM)					11.46
519												
520	**Gamma Kaplan-Meier (KM) Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
521	Approximate Chi Square Value (9.74, α)					3.779	Adjusted Chi Square Value (9.74, β)					3.697
522	95% Gamma Approximate KM-UCL (use when n>=50)					1.606	95% Gamma Adjusted KM-UCL (use when n<50)					1.642
523												
524	**Lognormal GOF Test on Detected Observations Only**											
525	Shapiro Wilk Test Statistic					0.881	**Shapiro Wilk GOF Test**					
526	5% Shapiro Wilk Critical Value					0.874	Detected Data appear Lognormal at 5% Significance Level					
527	Lilliefors Test Statistic					0.213	**Lilliefors GOF Test**					
528	5% Lilliefors Critical Value					0.226	Detected Data appear Lognormal at 5% Significance Level					
529	**Detected Data appear Lognormal at 5% Significance Level**											
530												
531	**Lognormal ROS Statistics Using Imputed Non-Detects**											
532	Mean in Original Scale					0.617	Mean in Log Scale					-3.238
533	SD in Original Scale					2.433	SD in Log Scale					1.837
534	95% t UCL (assumes normality of ROS data)					1.117	95% Percentile Bootstrap UCL					1.151
535	95% BCA Bootstrap UCL					1.46	95% Bootstrap t UCL					2.284
536	95% H-UCL (Log ROS)					0.401						
537												
538	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
539	KM Mean (logged)					-2.743	KM Geo Mean					0.0644
540	KM SD (logged)					1.44	95% Critical H Value (KM-Log)					2.32
541	KM Standard Error of Mean (logged)					0.192	95% H-UCL (KM -Log)					0.275
542	KM SD (logged)					1.44	95% Critical H Value (KM-Log)					2.32
543	KM Standard Error of Mean (logged)					0.192						
544												
545	**DL/2 Statistics**											
546	**DL/2 Normal**						**DL/2 Log-Transformed**					
547	Mean in Original Scale					0.624	Mean in Log Scale					-2.743
548	SD in Original Scale					2.431	SD in Log Scale					1.471
549	95% t UCL (Assumes normality)					1.123	95% H-Stat UCL					0.293
550	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
551												
552	**Nonparametric Distribution Free UCL Statistics**											
553	**Detected Data appear Gamma Distributed at 5% Significance Level**											
554												
555	**Suggested UCL to Use**											
556	95% KM Approximate Gamma UCL					1.606						
557												
558	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
559	Recommendations are based upon data size, data distribution, and skewness.											
560	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
561	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
562												
563	**Val_ANTIMONY**											
564												
565	**General Statistics**											
566	Total Number of Observations					66	Number of Distinct Observations					56
567	Number of Detects					26	Number of Non-Detects					40
568	Number of Distinct Detects					23	Number of Distinct Non-Detects					33
569	Minimum Detect					0.64	Minimum Non-Detect					4.7
570	Maximum Detect					447	Maximum Non-Detect					75.2
571	Variance Detects					7592	Percent Non-Detects					60.61%
572	Mean Detects					20.71	SD Detects					87.13

	A	B	C	D	E	F	G	H	I	J	K	L
573					Median Detects	1.35					CV Detects	4.208
574					Skewness Detects	5.065					Kurtosis Detects	25.75
575					Mean of Logged Detects	0.795					SD of Logged Detects	1.495
576												
577					**Normal GOF Test on Detects Only**							
578					Shapiro Wilk Test Statistic	0.239	**Shapiro Wilk GOF Test**					
579					5% Shapiro Wilk Critical Value	0.92	Detected Data Not Normal at 5% Significance Level					
580					Lilliefors Test Statistic	0.463	**Lilliefors GOF Test**					
581					5% Lilliefors Critical Value	0.17	Detected Data Not Normal at 5% Significance Level					
582					**Detected Data Not Normal at 5% Significance Level**							
583												
584					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
585					KM Mean	9.146	KM Standard Error of Mean					6.838
586					KM SD	54.44	95% KM (BCA) UCL					22.74
587					95% KM (t) UCL	20.56	95% KM (Percentile Bootstrap) UCL					22.67
588					95% KM (z) UCL	20.39	95% KM Bootstrap t UCL					141.2
589					90% KM Chebyshev UCL	29.66	95% KM Chebyshev UCL					38.95
590					97.5% KM Chebyshev UCL	51.85	99% KM Chebyshev UCL					77.18
591												
592					**Gamma GOF Tests on Detected Observations Only**							
593					A-D Test Statistic	5.271	**Anderson-Darling GOF Test**					
594					5% A-D Critical Value	0.85	Detected Data Not Gamma Distributed at 5% Significance Level					
595					K-S Test Statistic	0.367	**Kolmogorov-Smirnov GOF**					
596					5% K-S Critical Value	0.186	Detected Data Not Gamma Distributed at 5% Significance Level					
597					**Detected Data Not Gamma Distributed at 5% Significance Level**							
598												
599					**Gamma Statistics on Detected Data Only**							
600					k hat (MLE)	0.307	k star (bias corrected MLE)					0.297
601					Theta hat (MLE)	67.41	Theta star (bias corrected MLE)					69.63
602					nu hat (MLE)	15.97	nu star (bias corrected)					15.46
603					Mean (detects)	20.71						
604												
605					**Gamma ROS Statistics using Imputed Non-Detects**							
606					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
607					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
608					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
609					This is especially true when the sample size is small.							
610					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
611					Minimum	0.01	Mean					8.164
612					Maximum	447	Median					0.01
613					SD	54.99	CV					6.736
614					k hat (MLE)	0.165	k star (bias corrected MLE)					0.168
615					Theta hat (MLE)	49.33	Theta star (bias corrected MLE)					48.57
616					nu hat (MLE)	21.84	nu star (bias corrected)					22.18
617					Adjusted Level of Significance (β)	0.0464						
618					Approximate Chi Square Value (22.18, α)	12.48	Adjusted Chi Square Value (22.18, β)					12.31
619					95% Gamma Approximate UCL (use when n>=50)	14.52	95% Gamma Adjusted UCL (use when n<50)					14.71
620												
621					**Estimates of Gamma Parameters using KM Estimates**							
622					Mean (KM)	9.146	SD (KM)					54.44
623					Variance (KM)	2964	SE of Mean (KM)					6.838
624					k hat (KM)	0.0282	k star (KM)					0.037

625					nu hat (KM)	3.725					nu star (KM)	4.889
626					theta hat (KM)	324.1					theta star (KM)	246.9
627					80% gamma percentile (KM)	0.346					90% gamma percentile (KM)	8.59
628					95% gamma percentile (KM)	41.85					99% gamma percentile (KM)	221.8
629												
630					**Gamma Kaplan-Meier (KM) Statistics**							
631					Approximate Chi Square Value (4.89, α)	1.101					Adjusted Chi Square Value (4.89, β)	1.063
632					95% Gamma Approximate KM-UCL (use when n>=50)	40.6					95% Gamma Adjusted KM-UCL (use when n<50)	42.08
633												
634					**Lognormal GOF Test on Detected Observations Only**							
635					Shapiro Wilk Test Statistic	0.748					**Shapiro Wilk GOF Test**	
636					5% Shapiro Wilk Critical Value	0.92					Detected Data Not Lognormal at 5% Significance Level	
637					Lilliefors Test Statistic	0.247					**Lilliefors GOF Test**	
638					5% Lilliefors Critical Value	0.17					Detected Data Not Lognormal at 5% Significance Level	
639					**Detected Data Not Lognormal at 5% Significance Level**							
640												
641					**Lognormal ROS Statistics Using Imputed Non-Detects**							
642					Mean in Original Scale	9.139					Mean in Log Scale	0.579
643					SD in Original Scale	54.85					SD in Log Scale	0.971
644					95% t UCL (assumes normality of ROS data)	20.4					95% Percentile Bootstrap UCL	22.58
645					95% BCA Bootstrap UCL	35.56					95% Bootstrap t UCL	177.4
646					95% H-UCL (Log ROS)	3.745						
647												
648					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
649					KM Mean (logged)	0.47					KM Geo Mean	1.601
650					KM SD (logged)	1.065					95% Critical H Value (KM-Log)	2.263
651					KM Standard Error of Mean (logged)	0.165					95% H-UCL (KM -Log)	3.807
652					KM SD (logged)	1.065					95% Critical H Value (KM-Log)	2.263
653					KM Standard Error of Mean (logged)	0.165						
654												
655					**DL/2 Statistics**							
656					**DL/2 Normal**						**DL/2 Log-Transformed**	
657					Mean in Original Scale	12.23					Mean in Log Scale	1.375
658					SD in Original Scale	54.66					SD in Log Scale	1.103
659					95% t UCL (Assumes normality)	23.46					95% H-Stat UCL	9.901
660					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
661												
662					**Nonparametric Distribution Free UCL Statistics**							
663					**Data do not follow a Discernible Distribution at 5% Significance Level**							
664												
665					**Suggested UCL to Use**							
666					95% KM (Chebyshev) UCL	38.95						
667												
668					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
669					Recommendations are based upon data size, data distribution, and skewness.							
670					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
671					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
672												
673												
674	**Val_ARSENIC**											
675												
676					**General Statistics**							

677					Total Number of Observations	65					Number of Distinct Observations	57
678											Number of Missing Observations	0
679					Minimum	0.39					Mean	14.59
680					Maximum	123					Median	10.6
681					SD	15.96					Std. Error of Mean	1.98
682					Coefficient of Variation	1.094					Skewness	5.264
683												
684					**Normal GOF Test**							
685					Shapiro Wilk Test Statistic	0.528					**Shapiro Wilk GOF Test**	
686					5% Shapiro Wilk P Value	0					Data Not Normal at 5% Significance Level	
687					Lilliefors Test Statistic	0.273					**Lilliefors GOF Test**	
688					5% Lilliefors Critical Value	0.11					Data Not Normal at 5% Significance Level	
689					**Data Not Normal at 5% Significance Level**							
690												
691					**Assuming Normal Distribution**							
692					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
693					95% Student's-t UCL	17.9					95% Adjusted-CLT UCL (Chen-1995)	19.23
694											95% Modified-t UCL (Johnson-1978)	18.11
695												
696					**Gamma GOF Test**							
697					A-D Test Statistic	2.38					**Anderson-Darling Gamma GOF Test**	
698					5% A-D Critical Value	0.765					Data Not Gamma Distributed at 5% Significance Level	
699					K-S Test Statistic	0.156					**Kolmogorov-Smirnov Gamma GOF Test**	
700					5% K-S Critical Value	0.112					Data Not Gamma Distributed at 5% Significance Level	
701					**Data Not Gamma Distributed at 5% Significance Level**							
702												
703					**Gamma Statistics**							
704					k hat (MLE)	1.855					k star (bias corrected MLE)	1.779
705					Theta hat (MLE)	7.867					Theta star (bias corrected MLE)	8.2
706					nu hat (MLE)	241.1					nu star (bias corrected)	231.3
707					MLE Mean (bias corrected)	14.59					MLE Sd (bias corrected)	10.94
708											Approximate Chi Square Value (0.05)	197.1
709					Adjusted Level of Significance	0.0463					Adjusted Chi Square Value	196.4
710												
711					**Assuming Gamma Distribution**							
712					95% Approximate Gamma UCL (use when n>=50))	17.12					95% Adjusted Gamma UCL (use when n<50)	17.18
713												
714					**Lognormal GOF Test**							
715					Shapiro Wilk Test Statistic	0.903					**Shapiro Wilk Lognormal GOF Test**	
716					5% Shapiro Wilk P Value	2.3818E-5					Data Not Lognormal at 5% Significance Level	
717					Lilliefors Test Statistic	0.184					**Lilliefors Lognormal GOF Test**	
718					5% Lilliefors Critical Value	0.11					Data Not Lognormal at 5% Significance Level	
719					**Data Not Lognormal at 5% Significance Level**							
720												
721					**Lognormal Statistics**							
722					Minimum of Logged Data	-0.942					Mean of logged Data	2.387
723					Maximum of Logged Data	4.812					SD of logged Data	0.794
724												
725					**Assuming Lognormal Distribution**							
726					95% H-UCL	18.35					90% Chebyshev (MVUE) UCL	19.74
727					95% Chebyshev (MVUE) UCL	21.97					97.5% Chebyshev (MVUE) UCL	25.07
728					99% Chebyshev (MVUE) UCL	31.15						

729											
730	**Nonparametric Distribution Free UCL Statistics**										
731	**Data do not follow a Discernible Distribution (0.05)**										
732											
733	**Nonparametric Distribution Free UCLs**										
734				95% CLT UCL	17.85			95% Jackknife UCL	17.9		
735				95% Standard Bootstrap UCL	17.8			95% Bootstrap-t UCL	21.45		
736				95% Hall's Bootstrap UCL	32.08			95% Percentile Bootstrap UCL	18.19		
737				95% BCA Bootstrap UCL	19.78						
738				90% Chebyshev(Mean, Sd) UCL	20.53			95% Chebyshev(Mean, Sd) UCL	23.22		
739				97.5% Chebyshev(Mean, Sd) UCL	26.96			99% Chebyshev(Mean, Sd) UCL	34.29		
740											
741	**Suggested UCL to Use**										
742				95% Chebyshev (Mean, Sd) UCL	23.22						
743											
744	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.										
745	Recommendations are based upon data size, data distribution, and skewness.										
746	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).										
747	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.										
748											
749											
750	**Val_CHROMIUM**										
751											
752	**General Statistics**										
753				Total Number of Observations	66			Number of Distinct Observations	65		
754								Number of Missing Observations	0		
755				Minimum	9.6			Mean	1721		
756				Maximum	40000			Median	40.45		
757				SD	6302			Std. Error of Mean	775.7		
758				Coefficient of Variation	3.662			Skewness	4.922		
759											
760	**Normal GOF Test**										
761				Shapiro Wilk Test Statistic	0.317			**Shapiro Wilk GOF Test**			
762				5% Shapiro Wilk P Value	0			Data Not Normal at 5% Significance Level			
763				Lilliefors Test Statistic	0.442			**Lilliefors GOF Test**			
764				5% Lilliefors Critical Value	0.109			Data Not Normal at 5% Significance Level			
765	**Data Not Normal at 5% Significance Level**										
766											
767	**Assuming Normal Distribution**										
768				**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
769				95% Student's-t UCL	3015			95% Adjusted-CLT UCL (Chen-1995)	3499		
770								95% Modified-t UCL (Johnson-1978)	3094		
771											
772	**Gamma GOF Test**										
773				A-D Test Statistic	12.16			**Anderson-Darling Gamma GOF Test**			
774				5% A-D Critical Value	0.896			Data Not Gamma Distributed at 5% Significance Level			
775				K-S Test Statistic	0.357			**Kolmogorov-Smirnov Gamma GOF Test**			
776				5% K-S Critical Value	0.121			Data Not Gamma Distributed at 5% Significance Level			
777	**Data Not Gamma Distributed at 5% Significance Level**										
778											
779	**Gamma Statistics**										
780				k hat (MLE)	0.238			k star (bias corrected MLE)	0.237		

781					Theta hat (MLE)	7233					Theta star (bias corrected MLE)	7255
782					nu hat (MLE)	31.4					nu star (bias corrected)	31.31
783					MLE Mean (bias corrected)	1721					MLE Sd (bias corrected)	3533
784											Approximate Chi Square Value (0.05)	19.53
785					Adjusted Level of Significance	0.0464					Adjusted Chi Square Value	19.32
786												
787					**Assuming Gamma Distribution**							
788					95% Approximate Gamma UCL (use when n>=50))	2759					95% Adjusted Gamma UCL (use when n<50)	2789
789												
790					**Lognormal GOF Test**							
791					Shapiro Wilk Test Statistic	0.775					**Shapiro Wilk Lognormal GOF Test**	
792					5% Shapiro Wilk P Value	1.439E-13					Data Not Lognormal at 5% Significance Level	
793					Lilliefors Test Statistic	0.225					**Lilliefors Lognormal GOF Test**	
794					5% Lilliefors Critical Value	0.109					Data Not Lognormal at 5% Significance Level	
795					**Data Not Lognormal at 5% Significance Level**							
796												
797					**Lognormal Statistics**							
798					Minimum of Logged Data	2.262					Mean of logged Data	4.441
799					Maximum of Logged Data	10.6					SD of logged Data	1.989
800												
801					**Assuming Lognormal Distribution**							
802					95% H-UCL	1281					90% Chebyshev (MVUE) UCL	1190
803					95% Chebyshev (MVUE) UCL	1474					97.5% Chebyshev (MVUE) UCL	1867
804					99% Chebyshev (MVUE) UCL	2640						
805												
806					**Nonparametric Distribution Free UCL Statistics**							
807					**Data do not follow a Discernible Distribution (0.05)**							
808												
809					**Nonparametric Distribution Free UCLs**							
810					95% CLT UCL	2997					95% Jackknife UCL	3015
811					95% Standard Bootstrap UCL	2945					95% Bootstrap-t UCL	5172
812					95% Hall's Bootstrap UCL	7479					95% Percentile Bootstrap UCL	3090
813					95% BCA Bootstrap UCL	3795						
814					90% Chebyshev(Mean, Sd) UCL	4048					95% Chebyshev(Mean, Sd) UCL	5102
815					97.5% Chebyshev(Mean, Sd) UCL	6565					99% Chebyshev(Mean, Sd) UCL	9439
816												
817					**Suggested UCL to Use**							
818					95% Chebyshev (Mean, Sd) UCL	5102						
819												
820					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
821					Recommendations are based upon data size, data distribution, and skewness.							
822					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
823					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
824												
825												
826	**Val_COBALT**											
827												
828					**General Statistics**							
829					Total Number of Observations	66					Number of Distinct Observations	62
830											Number of Missing Observations	0
831					Minimum	1.7					Mean	1475
832					Maximum	34400					Median	21.55

833					SD	5351				Std. Error of Mean		658.6
834					Coefficient of Variation	3.628				Skewness		4.741
835												
836	**Normal GOF Test**											
837					Shapiro Wilk Test Statistic	0.326	**Shapiro Wilk GOF Test**					
838					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
839					Lilliefors Test Statistic	0.443	**Lilliefors GOF Test**					
840					5% Lilliefors Critical Value	0.109	Data Not Normal at 5% Significance Level					
841	**Data Not Normal at 5% Significance Level**											
842												
843	**Assuming Normal Distribution**											
844	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
845					95% Student's-t UCL	2574				95% Adjusted-CLT UCL (Chen-1995)		2969
846										95% Modified-t UCL (Johnson-1978)		2638
847												
848	**Gamma GOF Test**											
849					A-D Test Statistic	8.895	**Anderson-Darling Gamma GOF Test**					
850					5% A-D Critical Value	0.912	Data Not Gamma Distributed at 5% Significance Level					
851					K-S Test Statistic	0.288	**Kolmogorov-Smirnov Gamma GOF Test**					
852					5% K-S Critical Value	0.122	Data Not Gamma Distributed at 5% Significance Level					
853	**Data Not Gamma Distributed at 5% Significance Level**											
854												
855	**Gamma Statistics**											
856					k hat (MLE)	0.204				k star (bias corrected MLE)		0.205
857					Theta hat (MLE)	7219				Theta star (bias corrected MLE)		7191
858					nu hat (MLE)	26.97				nu star (bias corrected)		27.08
859					MLE Mean (bias corrected)	1475				MLE Sd (bias corrected)		3257
860										Approximate Chi Square Value (0.05)		16.21
861					Adjusted Level of Significance	0.0464				Adjusted Chi Square Value		16.02
862												
863	**Assuming Gamma Distribution**											
864					95% Approximate Gamma UCL (use when n>=50))	2464				95% Adjusted Gamma UCL (use when n<50)		2493
865												
866	**Lognormal GOF Test**											
867					Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**					
868					5% Shapiro Wilk P Value	4.9864E-6	Data Not Lognormal at 5% Significance Level					
869					Lilliefors Test Statistic	0.118	**Lilliefors Lognormal GOF Test**					
870					5% Lilliefors Critical Value	0.109	Data Not Lognormal at 5% Significance Level					
871	**Data Not Lognormal at 5% Significance Level**											
872												
873	**Lognormal Statistics**											
874					Minimum of Logged Data	0.531				Mean of logged Data		3.706
875					Maximum of Logged Data	10.45				SD of logged Data		2.455
876												
877	**Assuming Lognormal Distribution**											
878					95% H-UCL	2176				90% Chebyshev (MVUE) UCL		1740
879					95% Chebyshev (MVUE) UCL	2209				97.5% Chebyshev (MVUE) UCL		2860
880					99% Chebyshev (MVUE) UCL	4140						
881												
882	**Nonparametric Distribution Free UCL Statistics**											
883	**Data do not follow a Discernible Distribution (0.05)**											
884												

885	**Nonparametric Distribution Free UCLs**											
886					95% CLT UCL	2558				95% Jackknife UCL	2574	
887					95% Standard Bootstrap UCL	2523				95% Bootstrap-t UCL	3791	
888					95% Hall's Bootstrap UCL	3097				95% Percentile Bootstrap UCL	2604	
889					95% BCA Bootstrap UCL	3273						
890					90% Chebyshev(Mean, Sd) UCL	3451				95% Chebyshev(Mean, Sd) UCL	4346	
891					97.5% Chebyshev(Mean, Sd) UCL	5588				99% Chebyshev(Mean, Sd) UCL	8028	
892												
893	**Suggested UCL to Use**											
894					95% Chebyshev (Mean, Sd) UCL	4346						
895												
896	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
897	Recommendations are based upon data size, data distribution, and skewness.											
898	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
899	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
900												
901												
902	**Val_COPPER**											
903												
904	**General Statistics**											
905					Total Number of Observations	66				Number of Distinct Observations	63	
906										Number of Missing Observations	0	
907					Minimum	9				Mean	217.3	
908					Maximum	5580				Median	48.1	
909					SD	754.9				Std. Error of Mean	92.92	
910					Coefficient of Variation	3.474				Skewness	6.269	
911												
912	**Normal GOF Test**											
913					Shapiro Wilk Test Statistic	0.27				**Shapiro Wilk GOF Test**		
914					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
915					Lilliefors Test Statistic	0.394				**Lilliefors GOF Test**		
916					5% Lilliefors Critical Value	0.109				Data Not Normal at 5% Significance Level		
917	**Data Not Normal at 5% Significance Level**											
918												
919	**Assuming Normal Distribution**											
920					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
921					95% Student's-t UCL	372.4				95% Adjusted-CLT UCL (Chen-1995)	446.8	
922										95% Modified-t UCL (Johnson-1978)	384.3	
923												
924	**Gamma GOF Test**											
925					A-D Test Statistic	8.021				**Anderson-Darling Gamma GOF Test**		
926					5% A-D Critical Value	0.813				Data Not Gamma Distributed at 5% Significance Level		
927					K-S Test Statistic	0.254				**Kolmogorov-Smirnov Gamma GOF Test**		
928					5% K-S Critical Value	0.116				Data Not Gamma Distributed at 5% Significance Level		
929	**Data Not Gamma Distributed at 5% Significance Level**											
930												
931	**Gamma Statistics**											
932					k hat (MLE)	0.541				k star (bias corrected MLE)	0.526	
933					Theta hat (MLE)	402				Theta star (bias corrected MLE)	413.1	
934					nu hat (MLE)	71.35				nu star (bias corrected)	69.44	
935					MLE Mean (bias corrected)	217.3				MLE Sd (bias corrected)	299.6	
936										Approximate Chi Square Value (0.05)	51.26	

937	Adjusted Level of Significance					0.0464	Adjusted Chi Square Value					50.91
938												
939	**Assuming Gamma Distribution**											
940	95% Approximate Gamma UCL (use when n>=50))					294.4	95% Adjusted Gamma UCL (use when n<50)					296.4
941												
942	**Lognormal GOF Test**											
943	Shapiro Wilk Test Statistic					0.897	**Shapiro Wilk Lognormal GOF Test**					
944	5% Shapiro Wilk P Value					8.2208E-6	Data Not Lognormal at 5% Significance Level					
945	Lilliefors Test Statistic					0.141	**Lilliefors Lognormal GOF Test**					
946	5% Lilliefors Critical Value					0.109	Data Not Lognormal at 5% Significance Level					
947	**Data Not Lognormal at 5% Significance Level**											
948												
949	**Lognormal Statistics**											
950	Minimum of Logged Data					2.197	Mean of logged Data					4.22
951	Maximum of Logged Data					8.627	SD of logged Data					1.136
952												
953	**Assuming Lognormal Distribution**											
954	95% H-UCL					178	90% Chebyshev (MVUE) UCL					193.7
955	95% Chebyshev (MVUE) UCL					223.5	97.5% Chebyshev (MVUE) UCL					265
956	99% Chebyshev (MVUE) UCL					346.5						
957												
958	**Nonparametric Distribution Free UCL Statistics**											
959	**Data do not follow a Discernible Distribution (0.05)**											
960												
961	**Nonparametric Distribution Free UCLs**											
962	95% CLT UCL					370.1	95% Jackknife UCL					372.4
963	95% Standard Bootstrap UCL					363.2	95% Bootstrap-t UCL					1037
964	95% Hall's Bootstrap UCL					958.9	95% Percentile Bootstrap UCL					380.7
965	95% BCA Bootstrap UCL					478.2						
966	90% Chebyshev(Mean, Sd) UCL					496.1	95% Chebyshev(Mean, Sd) UCL					622.3
967	97.5% Chebyshev(Mean, Sd) UCL					797.6	99% Chebyshev(Mean, Sd) UCL					1142
968												
969	**Suggested UCL to Use**											
970	95% Chebyshev (Mean, Sd) UCL					622.3						
971												
972	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
973	Recommendations are based upon data size, data distribution, and skewness.											
974	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
975	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
976												
977												
978	**Val_IRON**											
979												
980	**General Statistics**											
981	Total Number of Observations					66	Number of Distinct Observations					59
982							Number of Missing Observations					0
983	Minimum					3680	Mean					30721
984	Maximum					291000	Median					27200
985	SD					35248	Std. Error of Mean					4339
986	Coefficient of Variation					1.147	Skewness					6.425
987												
988	**Normal GOF Test**											

	A	B	C	D	E	F	G	H	I	J	K	L
989					Shapiro Wilk Test Statistic	0.425	**Shapiro Wilk GOF Test**					
990					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
991					Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**					
992					5% Lilliefors Critical Value	0.109	Data Not Normal at 5% Significance Level					
993	**Data Not Normal at 5% Significance Level**											
994												
995	**Assuming Normal Distribution**											
996	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
997					95% Student's-t UCL	37961				95% Adjusted-CLT UCL (Chen-1995)		41524
998										95% Modified-t UCL (Johnson-1978)		38533
999												
1000	**Gamma GOF Test**											
1001					A-D Test Statistic	3.201	**Anderson-Darling Gamma GOF Test**					
1002					5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level					
1003					K-S Test Statistic	0.204	**Kolmogorov-Smirnov Gamma GOF Test**					
1004					5% K-S Critical Value	0.111	Data Not Gamma Distributed at 5% Significance Level					
1005	**Data Not Gamma Distributed at 5% Significance Level**											
1006												
1007	**Gamma Statistics**											
1008					k hat (MLE)	2.114				k star (bias corrected MLE)		2.028
1009					Theta hat (MLE)	14532				Theta star (bias corrected MLE)		15148
1010					nu hat (MLE)	279.1				nu star (bias corrected)		267.7
1011					MLE Mean (bias corrected)	30721				MLE Sd (bias corrected)		21572
1012										Approximate Chi Square Value (0.05)		230.8
1013					Adjusted Level of Significance	0.0464				Adjusted Chi Square Value		230.1
1014												
1015	**Assuming Gamma Distribution**											
1016					95% Approximate Gamma UCL (use when n>=50))	35631				95% Adjusted Gamma UCL (use when n<50)		35749
1017												
1018	**Lognormal GOF Test**											
1019					Shapiro Wilk Test Statistic	0.888	**Shapiro Wilk Lognormal GOF Test**					
1020					5% Shapiro Wilk P Value	2.0541E-6	Data Not Lognormal at 5% Significance Level					
1021					Lilliefors Test Statistic	0.177	**Lilliefors Lognormal GOF Test**					
1022					5% Lilliefors Critical Value	0.109	Data Not Lognormal at 5% Significance Level					
1023	**Data Not Lognormal at 5% Significance Level**											
1024												
1025	**Lognormal Statistics**											
1026					Minimum of Logged Data	8.211				Mean of logged Data		10.08
1027					Maximum of Logged Data	12.58				SD of logged Data		0.693
1028												
1029	**Assuming Lognormal Distribution**											
1030					95% H-UCL	35966				90% Chebyshev (MVUE) UCL		38593
1031					95% Chebyshev (MVUE) UCL	42425				97.5% Chebyshev (MVUE) UCL		47743
1032					99% Chebyshev (MVUE) UCL	58189						
1033												
1034	**Nonparametric Distribution Free UCL Statistics**											
1035	**Data do not follow a Discernible Distribution (0.05)**											
1036												
1037	**Nonparametric Distribution Free UCLs**											
1038					95% CLT UCL	37858				95% Jackknife UCL		37961
1039					95% Standard Bootstrap UCL	38042				95% Bootstrap-t UCL		48868
1040					95% Hall's Bootstrap UCL	69210				95% Percentile Bootstrap UCL		38936

	A	B	C	D	E	F	G	H	I	J	K	L
1041					95% BCA Bootstrap UCL	43911						
1042					90% Chebyshev(Mean, Sd) UCL	43737				95% Chebyshev(Mean, Sd) UCL		49633
1043					97.5% Chebyshev(Mean, Sd) UCL	57816				99% Chebyshev(Mean, Sd) UCL		73891
1044												
1045					**Suggested UCL to Use**							
1046					95% Chebyshev (Mean, Sd) UCL	49633						
1047												
1048	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1049	Recommendations are based upon data size, data distribution, and skewness.											
1050	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1051	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1052												
1053												
1054	**Val_MERCURY**											
1055												
1056					**General Statistics**							
1057					Total Number of Observations	66				Number of Distinct Observations		54
1058										Number of Missing Observations		0
1059					Minimum	0.05				Mean		2.586
1060					Maximum	100				Median		0.523
1061					SD	12.26				Std. Error of Mean		1.509
1062					Coefficient of Variation	4.74				Skewness		7.959
1063												
1064					**Normal GOF Test**							
1065					Shapiro Wilk Test Statistic	0.189				**Shapiro Wilk GOF Test**		
1066					5% Shapiro Wilk P Value	0				Data Not Normal at 5% Significance Level		
1067					Lilliefors Test Statistic	0.418				**Lilliefors GOF Test**		
1068					5% Lilliefors Critical Value	0.109				Data Not Normal at 5% Significance Level		
1069					**Data Not Normal at 5% Significance Level**							
1070												
1071					**Assuming Normal Distribution**							
1072					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
1073					95% Student's-t UCL	5.104				95% Adjusted-CLT UCL (Chen-1995)		6.648
1074										95% Modified-t UCL (Johnson-1978)		5.35
1075												
1076					**Gamma GOF Test**							
1077					A-D Test Statistic	7.519				**Anderson-Darling Gamma GOF Test**		
1078					5% A-D Critical Value	0.826				Data Not Gamma Distributed at 5% Significance Level		
1079					K-S Test Statistic	0.266				**Kolmogorov-Smirnov Gamma GOF Test**		
1080					5% K-S Critical Value	0.117				Data Not Gamma Distributed at 5% Significance Level		
1081					**Data Not Gamma Distributed at 5% Significance Level**							
1082												
1083					**Gamma Statistics**							
1084					k hat (MLE)	0.459				k star (bias corrected MLE)		0.449
1085					Theta hat (MLE)	5.628				Theta star (bias corrected MLE)		5.764
1086					nu hat (MLE)	60.65				nu star (bias corrected)		59.23
1087					MLE Mean (bias corrected)	2.586				MLE Sd (bias corrected)		3.861
1088										Approximate Chi Square Value (0.05)		42.53
1089					Adjusted Level of Significance	0.0464				Adjusted Chi Square Value		42.22
1090												
1091					**Assuming Gamma Distribution**							
1092					95% Approximate Gamma UCL (use when n>=50))	3.601				95% Adjusted Gamma UCL (use when n<50)		3.628

1093												
1094	**Lognormal GOF Test**											
1095					Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk Lognormal GOF Test**					
1096					5% Shapiro Wilk P Value	0.0102	Data Not Lognormal at 5% Significance Level					
1097					Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**					
1098					5% Lilliefors Critical Value	0.109	Data Not Lognormal at 5% Significance Level					
1099	**Data Not Lognormal at 5% Significance Level**											
1100												
1101	**Lognormal Statistics**											
1102					Minimum of Logged Data	-2.996	Mean of logged Data	-0.451				
1103					Maximum of Logged Data	4.605	SD of logged Data	1.256				
1104												
1105	**Assuming Lognormal Distribution**											
1106					95% H-UCL	1.963	90% Chebyshev (MVUE) UCL	2.184				
1107					95% Chebyshev (MVUE) UCL	2.55	97.5% Chebyshev (MVUE) UCL	3.06				
1108					99% Chebyshev (MVUE) UCL	4.06						
1109												
1110	**Nonparametric Distribution Free UCL Statistics**											
1111	**Data do not follow a Discernible Distribution (0.05)**											
1112												
1113	**Nonparametric Distribution Free UCLs**											
1114					95% CLT UCL	5.068	95% Jackknife UCL	5.104				
1115					95% Standard Bootstrap UCL	5.072	95% Bootstrap-t UCL	20.05				
1116					95% Hall's Bootstrap UCL	13.97	95% Percentile Bootstrap UCL	5.555				
1117					95% BCA Bootstrap UCL	7.202						
1118					90% Chebyshev(Mean, Sd) UCL	7.113	95% Chebyshev(Mean, Sd) UCL	9.163				
1119					97.5% Chebyshev(Mean, Sd) UCL	12.01	99% Chebyshev(Mean, Sd) UCL	17.6				
1120												
1121	**Suggested UCL to Use**											
1122					95% Chebyshev (Mean, Sd) UCL	9.163						
1123												
1124	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1125	Recommendations are based upon data size, data distribution, and skewness.											
1126	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1127	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1128												
1129												
1130	**Val_NICKEL**											
1131												
1132	**General Statistics**											
1133					Total Number of Observations	66	Number of Distinct Observations	66				
1134							Number of Missing Observations	0				
1135					Minimum	12.5	Mean	1493				
1136					Maximum	56700	Median	38.65				
1137					SD	7241	Std. Error of Mean	891.4				
1138					Coefficient of Variation	4.849	Skewness	7.125				
1139												
1140	**Normal GOF Test**											
1141					Shapiro Wilk Test Statistic	0.229	**Shapiro Wilk GOF Test**					
1142					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
1143					Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**					
1144					5% Lilliefors Critical Value	0.109	Data Not Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1145	**Data Not Normal at 5% Significance Level**											
1146												
1147	**Assuming Normal Distribution**											
1148	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1149	95% Student's-t UCL					2981	95% Adjusted-CLT UCL (Chen-1995)					3795
1150							95% Modified-t UCL (Johnson-1978)					3111
1151												
1152	**Gamma GOF Test**											
1153	A-D Test Statistic					12.42	**Anderson-Darling Gamma GOF Test**					
1154	5% A-D Critical Value					0.897	Data Not Gamma Distributed at 5% Significance Level					
1155	K-S Test Statistic					0.35	**Kolmogorov-Smirnov Gamma GOF Test**					
1156	5% K-S Critical Value					0.121	Data Not Gamma Distributed at 5% Significance Level					
1157	**Data Not Gamma Distributed at 5% Significance Level**											
1158												
1159	**Gamma Statistics**											
1160	k hat (MLE)					0.236	k star (bias corrected MLE)					0.235
1161	Theta hat (MLE)					6335	Theta star (bias corrected MLE)					6352
1162	nu hat (MLE)					31.12	nu star (bias corrected)					31.04
1163	MLE Mean (bias corrected)					1493	MLE Sd (bias corrected)					3080
1164							Approximate Chi Square Value (0.05)					19.31
1165	Adjusted Level of Significance					0.0464	Adjusted Chi Square Value					19.1
1166												
1167	**Assuming Gamma Distribution**											
1168	95% Approximate Gamma UCL (use when n>=50))					2400	95% Adjusted Gamma UCL (use when n<50)					2426
1169												
1170	**Lognormal GOF Test**											
1171	Shapiro Wilk Test Statistic					0.781	**Shapiro Wilk Lognormal GOF Test**					
1172	5% Shapiro Wilk P Value					3.306E-13	Data Not Lognormal at 5% Significance Level					
1173	Lilliefors Test Statistic					0.194	**Lilliefors Lognormal GOF Test**					
1174	5% Lilliefors Critical Value					0.109	Data Not Lognormal at 5% Significance Level					
1175	**Data Not Lognormal at 5% Significance Level**											
1176												
1177	**Lognormal Statistics**											
1178	Minimum of Logged Data					2.526	Mean of logged Data					4.267
1179	Maximum of Logged Data					10.95	SD of logged Data					1.883
1180												
1181	**Assuming Lognormal Distribution**											
1182	95% H-UCL					818.1	90% Chebyshev (MVUE) UCL					794
1183	95% Chebyshev (MVUE) UCL					976.3	97.5% Chebyshev (MVUE) UCL					1229
1184	99% Chebyshev (MVUE) UCL					1726						
1185												
1186	**Nonparametric Distribution Free UCL Statistics**											
1187	**Data do not follow a Discernible Distribution (0.05)**											
1188												
1189	**Nonparametric Distribution Free UCLs**											
1190	95% CLT UCL					2960	95% Jackknife UCL					2981
1191	95% Standard Bootstrap UCL					2950	95% Bootstrap-t UCL					7507
1192	95% Hall's Bootstrap UCL					7542	95% Percentile Bootstrap UCL					3099
1193	95% BCA Bootstrap UCL					4216						
1194	90% Chebyshev(Mean, Sd) UCL					4167	95% Chebyshev(Mean, Sd) UCL					5379
1195	97.5% Chebyshev(Mean, Sd) UCL					7060	99% Chebyshev(Mean, Sd) UCL					10362
1196												

	A	B	C	D	E	F	G	H	I	J	K	L
1197	**Suggested UCL to Use**											
1198				95% Chebyshev (Mean, Sd) UCL		5379						
1199												
1200	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1201	Recommendations are based upon data size, data distribution, and skewness.											
1202	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1203	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1204												
1205	**Val_THALLIUM**											
1206												
1207	**General Statistics**											
1208				Total Number of Observations		65			Number of Distinct Observations			45
1209				Number of Detects		36			Number of Non-Detects			29
1210				Number of Distinct Detects		22			Number of Distinct Non-Detects			24
1211				Minimum Detect		0.28			Minimum Non-Detect			2.1
1212				Maximum Detect		63.1			Maximum Non-Detect			31.3
1213				Variance Detects		106			Percent Non-Detects			44.62%
1214				Mean Detects		3.192			SD Detects			10.3
1215				Median Detects		1.5			CV Detects			3.226
1216				Skewness Detects		5.951			Kurtosis Detects			35.59
1217				Mean of Logged Detects		0.379			SD of Logged Detects			0.826
1218												
1219	**Normal GOF Test on Detects Only**											
1220				Shapiro Wilk Test Statistic		0.22			**Shapiro Wilk GOF Test**			
1221				5% Shapiro Wilk Critical Value		0.935			Detected Data Not Normal at 5% Significance Level			
1222				Lilliefors Test Statistic		0.463			**Lilliefors GOF Test**			
1223				5% Lilliefors Critical Value		0.145			Detected Data Not Normal at 5% Significance Level			
1224	**Detected Data Not Normal at 5% Significance Level**											
1225												
1226	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1227				KM Mean		2.394			KM Standard Error of Mean			0.96
1228				KM SD		7.618			95% KM (BCA) UCL			4.279
1229				95% KM (t) UCL		3.997			95% KM (Percentile Bootstrap) UCL			4.271
1230				95% KM (z) UCL		3.974			95% KM Bootstrap t UCL			14.26
1231				90% KM Chebyshev UCL		5.275			95% KM Chebyshev UCL			6.58
1232				97.5% KM Chebyshev UCL		8.392			99% KM Chebyshev UCL			11.95
1233												
1234	**Gamma GOF Tests on Detected Observations Only**											
1235				A-D Test Statistic		6.632			**Anderson-Darling GOF Test**			
1236				5% A-D Critical Value		0.787			Detected Data Not Gamma Distributed at 5% Significance Level			
1237				K-S Test Statistic		0.381			**Kolmogorov-Smirnov GOF**			
1238				5% K-S Critical Value		0.153			Detected Data Not Gamma Distributed at 5% Significance Level			
1239	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1240												
1241	**Gamma Statistics on Detected Data Only**											
1242				k hat (MLE)		0.764			k star (bias corrected MLE)			0.719
1243				Theta hat (MLE)		4.176			Theta star (bias corrected MLE)			4.439
1244				nu hat (MLE)		55.03			nu star (bias corrected)			51.78
1245				Mean (detects)		3.192						
1246												
1247	**Gamma ROS Statistics using Imputed Non-Detects**											
1248	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

1249	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1250	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1251	This is especially true when the sample size is small.											
1252	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1253					Minimum	0.01				Mean		2.113
1254					Maximum	63.1				Median		1
1255					SD	7.741				CV		3.664
1256					k hat (MLE)	0.607				k star (bias corrected MLE)		0.589
1257					Theta hat (MLE)	3.481				Theta star (bias corrected MLE)		3.586
1258					nu hat (MLE)	78.89				nu star (bias corrected)		76.59
1259					Adjusted Level of Significance (β)	0.0463						
1260					Approximate Chi Square Value (76.59, α)	57.43				Adjusted Chi Square Value (76.59, β)		57.05
1261					95% Gamma Approximate UCL (use when n>=50)	2.817				95% Gamma Adjusted UCL (use when n<50)		2.836
1262												
1263	**Estimates of Gamma Parameters using KM Estimates**											
1264					Mean (KM)	2.394				SD (KM)		7.618
1265					Variance (KM)	58.03				SE of Mean (KM)		0.96
1266					k hat (KM)	0.0988				k star (KM)		0.104
1267					nu hat (KM)	12.84				nu star (KM)		13.58
1268					theta hat (KM)	24.24				theta star (KM)		22.92
1269					80% gamma percentile (KM)	1.767				90% gamma percentile (KM)		6.483
1270					95% gamma percentile (KM)	13.86				99% gamma percentile (KM)		37.2
1271												
1272	**Gamma Kaplan-Meier (KM) Statistics**											
1273					Approximate Chi Square Value (13.58, α)	6.285				Adjusted Chi Square Value (13.58, β)		6.172
1274					95% Gamma Approximate KM-UCL (use when n>=50)	5.173				95% Gamma Adjusted KM-UCL (use when n<50)		5.267
1275												
1276	**Lognormal GOF Test on Detected Observations Only**											
1277					Shapiro Wilk Test Statistic	0.759				**Shapiro Wilk GOF Test**		
1278					5% Shapiro Wilk Critical Value	0.935				Detected Data Not Lognormal at 5% Significance Level		
1279					Lilliefors Test Statistic	0.23				**Lilliefors GOF Test**		
1280					5% Lilliefors Critical Value	0.145				Detected Data Not Lognormal at 5% Significance Level		
1281	**Detected Data Not Lognormal at 5% Significance Level**											
1282												
1283	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1284					Mean in Original Scale	2.383				Mean in Log Scale		0.346
1285					SD in Original Scale	7.671				SD in Log Scale		0.624
1286					95% t UCL (assumes normality of ROS data)	3.971				95% Percentile Bootstrap UCL		4.265
1287					95% BCA Bootstrap UCL	6.171				95% Bootstrap t UCL		21.77
1288					95% H-UCL (Log ROS)	2.001						
1289												
1290	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1291					KM Mean (logged)	0.317				KM Geo Mean		1.373
1292					KM SD (logged)	0.691				95% Critical H Value (KM-Log)		2.004
1293					KM Standard Error of Mean (logged)	0.103				95% H-UCL (KM -Log)		2.073
1294					KM SD (logged)	0.691				95% Critical H Value (KM-Log)		2.004
1295					KM Standard Error of Mean (logged)	0.103						
1296												
1297	**DL/2 Statistics**											
1298	**DL/2 Normal**									**DL/2 Log-Transformed**		
1299					Mean in Original Scale	3.059				Mean in Log Scale		0.593
1300					SD in Original Scale	7.845				SD in Log Scale		0.75

	A	B	C	D	E	F	G	H	I	J	K	L
1301				95% t UCL (Assumes normality)		4.683					95% H-Stat UCL	2.904
1302	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1303												
1304	**Nonparametric Distribution Free UCL Statistics**											
1305	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1306												
1307	**Suggested UCL to Use**											
1308				95% KM (Chebyshev) UCL		6.58						
1309												
1310	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1311	Recommendations are based upon data size, data distribution, and skewness.											
1312	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1313	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1314												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3	User Selected Options											
4	Date/Time of Computation	ProUCL 5.111/27/2017 5:32:51 PM										
5	From File	SED532-EstuarineWtld_Sed=0-2_Formatted_Data_b.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	**Val_BISMUTH_212**											
12												
13	**General Statistics**											
14	Total Number of Observations				36		Number of Distinct Observations				27	
15							Number of Missing Observations				0	
16	Minimum				0.591		Mean				1.141	
17	Maximum				1.42		Median				1.21	
18	SD				0.228		Std. Error of Mean				0.0379	
19	Coefficient of Variation				0.199		Skewness				-0.956	
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic				0.881		**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value				0.935		Data Not Normal at 5% Significance Level					
24	Lilliefors Test Statistic				0.235		**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value				0.145		Data Not Normal at 5% Significance Level					
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL				1.205		95% Adjusted-CLT UCL (Chen-1995)				1.197	
31							95% Modified-t UCL (Johnson-1978)				1.204	
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic				2.038		**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value				0.747		Data Not Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic				0.258		**Kolmogorov-Smirnov Gamma GOF Test**					
37	5% K-S Critical Value				0.147		Data Not Gamma Distributed at 5% Significance Level					
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)				21.78		k star (bias corrected MLE)				19.98	
42	Theta hat (MLE)				0.0524		Theta star (bias corrected MLE)				0.0571	
43	nu hat (MLE)				1568		nu star (bias corrected)				1439	
44	MLE Mean (bias corrected)				1.141		MLE Sd (bias corrected)				0.255	
45							Approximate Chi Square Value (0.05)				1352	
46	Adjusted Level of Significance				0.0428		Adjusted Chi Square Value				1348	
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))				1.214		95% Adjusted Gamma UCL (use when n<50)				1.218	
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic				0.836		**Shapiro Wilk Lognormal GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.935	Data Not Lognormal at 5% Significance Level					
54				Lilliefors Test Statistic		0.265	**Lilliefors Lognormal GOF Test**					
55				5% Lilliefors Critical Value		0.145	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59				Minimum of Logged Data		-0.526				Mean of logged Data		0.109
60				Maximum of Logged Data		0.351				SD of logged Data		0.229
61												
62	**Assuming Lognormal Distribution**											
63				95% H-UCL		1.224				90% Chebyshev (MVUE) UCL		1.275
64				95% Chebyshev (MVUE) UCL		1.335				97.5% Chebyshev (MVUE) UCL		1.418
65				99% Chebyshev (MVUE) UCL		1.581						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71				95% CLT UCL		1.203				95% Jackknife UCL		1.205
72				95% Standard Bootstrap UCL		1.203				95% Bootstrap-t UCL		1.201
73				95% Hall's Bootstrap UCL		1.198				95% Percentile Bootstrap UCL		1.201
74				95% BCA Bootstrap UCL		1.198						
75				90% Chebyshev(Mean, Sd) UCL		1.255				95% Chebyshev(Mean, Sd) UCL		1.306
76				97.5% Chebyshev(Mean, Sd) UCL		1.378				99% Chebyshev(Mean, Sd) UCL		1.518
77												
78	**Suggested UCL to Use**											
79				95% Student's-t UCL		1.205				or 95% Modified-t UCL		1.204
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Val_BISMUTH_214**											
91												
92	**General Statistics**											
93				Total Number of Observations		36				Number of Distinct Observations		33
94										Number of Missing Observations		0
95				Minimum		0.373				Mean		0.579
96				Maximum		1.178				Median		0.575
97				SD		0.138				Std. Error of Mean		0.0229
98				Coefficient of Variation		0.237				Skewness		2.495
99												
100	**Normal GOF Test**											
101				Shapiro Wilk Test Statistic		0.761	**Shapiro Wilk GOF Test**					
102				5% Shapiro Wilk Critical Value		0.935	Data Not Normal at 5% Significance Level					
103				Lilliefors Test Statistic		0.229	**Lilliefors GOF Test**					
104				5% Lilliefors Critical Value		0.145	Data Not Normal at 5% Significance Level					

105	**Data Not Normal at 5% Significance Level**											
106												
107	**Assuming Normal Distribution**											
108	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
109	95% Student's-t UCL				0.618		95% Adjusted-CLT UCL (Chen-1995)					0.627
110							95% Modified-t UCL (Johnson-1978)					0.62
111												
112	**Gamma GOF Test**											
113	A-D Test Statistic				1.741		**Anderson-Darling Gamma GOF Test**					
114	5% A-D Critical Value				0.747		Data Not Gamma Distributed at 5% Significance Level					
115	K-S Test Statistic				0.191		**Kolmogorov-Smirnov Gamma GOF Test**					
116	5% K-S Critical Value				0.147		Data Not Gamma Distributed at 5% Significance Level					
117	**Data Not Gamma Distributed at 5% Significance Level**											
118												
119	**Gamma Statistics**											
120	k hat (MLE)				22.55		k star (bias corrected MLE)					20.69
121	Theta hat (MLE)				0.0257		Theta star (bias corrected MLE)					0.028
122	nu hat (MLE)				1624		nu star (bias corrected)					1490
123	MLE Mean (bias corrected)				0.579		MLE Sd (bias corrected)					0.127
124							Approximate Chi Square Value (0.05)					1401
125	Adjusted Level of Significance				0.0428		Adjusted Chi Square Value					1397
126												
127	**Assuming Gamma Distribution**											
128	95% Approximate Gamma UCL (use when n>=50))				0.616		95% Adjusted Gamma UCL (use when n<50)					0.618
129												
130	**Lognormal GOF Test**											
131	Shapiro Wilk Test Statistic				0.881		**Shapiro Wilk Lognormal GOF Test**					
132	5% Shapiro Wilk Critical Value				0.935		Data Not Lognormal at 5% Significance Level					
133	Lilliefors Test Statistic				0.177		**Lilliefors Lognormal GOF Test**					
134	5% Lilliefors Critical Value				0.145		Data Not Lognormal at 5% Significance Level					
135	**Data Not Lognormal at 5% Significance Level**											
136												
137	**Lognormal Statistics**											
138	Minimum of Logged Data				-0.986		Mean of logged Data					-0.568
139	Maximum of Logged Data				0.164		SD of logged Data					0.207
140												
141	**Assuming Lognormal Distribution**											
142	95% H-UCL				0.615		90% Chebyshev (MVUE) UCL					0.639
143	95% Chebyshev (MVUE) UCL				0.666		97.5% Chebyshev (MVUE) UCL					0.704
144	99% Chebyshev (MVUE) UCL				0.778							
145												
146	**Nonparametric Distribution Free UCL Statistics**											
147	**Data do not follow a Discernible Distribution (0.05)**											
148												
149	**Nonparametric Distribution Free UCLs**											
150	95% CLT UCL				0.617		95% Jackknife UCL					0.618
151	95% Standard Bootstrap UCL				0.617		95% Bootstrap-t UCL					0.636
152	95% Hall's Bootstrap UCL				0.824		95% Percentile Bootstrap UCL					0.618
153	95% BCA Bootstrap UCL				0.632							
154	90% Chebyshev(Mean, Sd) UCL				0.648		95% Chebyshev(Mean, Sd) UCL					0.679
155	97.5% Chebyshev(Mean, Sd) UCL				0.723		99% Chebyshev(Mean, Sd) UCL					0.808
156												

157	**Suggested UCL to Use**											
158				95% Student's-t UCL		0.618			or 95% Modified-t UCL			0.62
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	Recommendations are based upon data size, data distribution, and skewness.											
162	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
163	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
164												
165												
166	**Val_LEAD_212**											
167												
168	**General Statistics**											
169				Total Number of Observations		36			Number of Distinct Observations			34
170									Number of Missing Observations			0
171				Minimum		0.462			Mean			0.924
172				Maximum		1.24			Median			0.941
173				SD		0.188			Std. Error of Mean			0.0314
174				Coefficient of Variation		0.204			Skewness			-0.573
175												
176	**Normal GOF Test**											
177				Shapiro Wilk Test Statistic		0.962			**Shapiro Wilk GOF Test**			
178				5% Shapiro Wilk Critical Value		0.935			Data appear Normal at 5% Significance Level			
179				Lilliefors Test Statistic		0.106			**Lilliefors GOF Test**			
180				5% Lilliefors Critical Value		0.145			Data appear Normal at 5% Significance Level			
181	**Data appear Normal at 5% Significance Level**											
182												
183	**Assuming Normal Distribution**											
184				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
185				95% Student's-t UCL		0.977			95% Adjusted-CLT UCL (Chen-1995)			0.972
186									95% Modified-t UCL (Johnson-1978)			0.977
187												
188	**Gamma GOF Test**											
189				A-D Test Statistic		0.731			**Anderson-Darling Gamma GOF Test**			
190				5% A-D Critical Value		0.747			Detected data appear Gamma Distributed at 5% Significance Level			
191				K-S Test Statistic		0.136			**Kolmogorov-Smirnov Gamma GOF Test**			
192				5% K-S Critical Value		0.147			Detected data appear Gamma Distributed at 5% Significance Level			
193	**Detected data appear Gamma Distributed at 5% Significance Level**											
194												
195	**Gamma Statistics**											
196				k hat (MLE)		21.66			k star (bias corrected MLE)			19.87
197				Theta hat (MLE)		0.0427			Theta star (bias corrected MLE)			0.0465
198				nu hat (MLE)		1560			nu star (bias corrected)			1431
199				MLE Mean (bias corrected)		0.924			MLE Sd (bias corrected)			0.207
200									Approximate Chi Square Value (0.05)			1344
201				Adjusted Level of Significance		0.0428			Adjusted Chi Square Value			1340
202												
203	**Assuming Gamma Distribution**											
204				95% Approximate Gamma UCL (use when n>=50))		0.984			95% Adjusted Gamma UCL (use when n<50)			0.986
205												
206	**Lognormal GOF Test**											
207				Shapiro Wilk Test Statistic		0.913			**Shapiro Wilk Lognormal GOF Test**			
208				5% Shapiro Wilk Critical Value		0.935			Data Not Lognormal at 5% Significance Level			

209					Lilliefors Test Statistic	0.154	**Lilliefors Lognormal GOF Test**					
210					5% Lilliefors Critical Value	0.145	Data Not Lognormal at 5% Significance Level					
211	**Data Not Lognormal at 5% Significance Level**											
212												
213	**Lognormal Statistics**											
214					Minimum of Logged Data	-0.772				Mean of logged Data		-0.102
215					Maximum of Logged Data	0.215				SD of logged Data		0.228
216												
217	**Assuming Lognormal Distribution**											
218					95% H-UCL	0.991				90% Chebyshev (MVUE) UCL		1.032
219					95% Chebyshev (MVUE) UCL	1.08				97.5% Chebyshev (MVUE) UCL		1.147
220					99% Chebyshev (MVUE) UCL	1.279						
221												
222	**Nonparametric Distribution Free UCL Statistics**											
223	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
224												
225	**Nonparametric Distribution Free UCLs**											
226					95% CLT UCL	0.976				95% Jackknife UCL		0.977
227					95% Standard Bootstrap UCL	0.974				95% Bootstrap-t UCL		0.972
228					95% Hall's Bootstrap UCL	0.972				95% Percentile Bootstrap UCL		0.974
229					95% BCA Bootstrap UCL	0.975						
230					90% Chebyshev(Mean, Sd) UCL	1.018				95% Chebyshev(Mean, Sd) UCL		1.061
231					97.5% Chebyshev(Mean, Sd) UCL	1.12				99% Chebyshev(Mean, Sd) UCL		1.236
232												
233	**Suggested UCL to Use**											
234					95% Student's-t UCL	0.977						
235												
236	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
237	Recommendations are based upon data size, data distribution, and skewness.											
238	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
239	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
240												
241	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
242	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
243												
244												
245	**Val_LEAD_214**											
246												
247	**General Statistics**											
248					Total Number of Observations	36				Number of Distinct Observations		36
249										Number of Missing Observations		0
250					Minimum	0.423				Mean		0.675
251					Maximum	1.395				Median		0.657
252					SD	0.174				Std. Error of Mean		0.029
253					Coefficient of Variation	0.257				Skewness		2.374
254												
255	**Normal GOF Test**											
256					Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**					
257					5% Shapiro Wilk Critical Value	0.935	Data Not Normal at 5% Significance Level					
258					Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**					
259					5% Lilliefors Critical Value	0.145	Data Not Normal at 5% Significance Level					
260	**Data Not Normal at 5% Significance Level**											

261												
262	**Assuming Normal Distribution**											
263	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
264					95% Student's-t UCL	0.724				95% Adjusted-CLT UCL (Chen-1995)		0.735
265										95% Modified-t UCL (Johnson-1978)		0.726
266												
267	**Gamma GOF Test**											
268					A-D Test Statistic	1.478	**Anderson-Darling Gamma GOF Test**					
269					5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level					
270					K-S Test Statistic	0.179	**Kolmogorov-Smirnov Gamma GOF Test**					
271					5% K-S Critical Value	0.147	Data Not Gamma Distributed at 5% Significance Level					
272	**Data Not Gamma Distributed at 5% Significance Level**											
273												
274	**Gamma Statistics**											
275					k hat (MLE)	19.32				k star (bias corrected MLE)		17.73
276					Theta hat (MLE)	0.0349				Theta star (bias corrected MLE)		0.0381
277					nu hat (MLE)	1391				nu star (bias corrected)		1276
278					MLE Mean (bias corrected)	0.675				MLE Sd (bias corrected)		0.16
279										Approximate Chi Square Value (0.05)		1194
280					Adjusted Level of Significance	0.0428				Adjusted Chi Square Value		1191
281												
282	**Assuming Gamma Distribution**											
283	95% Approximate Gamma UCL (use when n>=50))					0.721				95% Adjusted Gamma UCL (use when n<50)		0.724
284												
285	**Lognormal GOF Test**											
286					Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk Lognormal GOF Test**					
287					5% Shapiro Wilk Critical Value	0.935	Data Not Lognormal at 5% Significance Level					
288					Lilliefors Test Statistic	0.166	**Lilliefors Lognormal GOF Test**					
289					5% Lilliefors Critical Value	0.145	Data Not Lognormal at 5% Significance Level					
290	**Data Not Lognormal at 5% Significance Level**											
291												
292	**Lognormal Statistics**											
293					Minimum of Logged Data	-0.86				Mean of logged Data		-0.419
294					Maximum of Logged Data	0.333				SD of logged Data		0.223
295												
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	0.72				90% Chebyshev (MVUE) UCL		0.75
298					95% Chebyshev (MVUE) UCL	0.784				97.5% Chebyshev (MVUE) UCL		0.832
299					99% Chebyshev (MVUE) UCL	0.925						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data do not follow a Discernible Distribution (0.05)**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	0.723				95% Jackknife UCL		0.724
306					95% Standard Bootstrap UCL	0.722				95% Bootstrap-t UCL		0.741
307					95% Hall's Bootstrap UCL	0.968				95% Percentile Bootstrap UCL		0.723
308					95% BCA Bootstrap UCL	0.737						
309					90% Chebyshev(Mean, Sd) UCL	0.762				95% Chebyshev(Mean, Sd) UCL		0.801
310					97.5% Chebyshev(Mean, Sd) UCL	0.856				99% Chebyshev(Mean, Sd) UCL		0.963
311												
312	**Suggested UCL to Use**											

313					95% Student's-t UCL	0.724				or 95% Modified-t UCL		0.726
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	Recommendations are based upon data size, data distribution, and skewness.											
317	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
318	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
319												
320												
321	**Val_POTASSIUM_40**											
322												
323	**General Statistics**											
324					Total Number of Observations	36				Number of Distinct Observations		30
325										Number of Missing Observations		0
326					Minimum	4.85				Mean		14.36
327					Maximum	18.6				Median		14.95
328					SD	3.04				Std. Error of Mean		0.507
329					Coefficient of Variation	0.212				Skewness		-1.397
330												
331	**Normal GOF Test**											
332					Shapiro Wilk Test Statistic	0.887				**Shapiro Wilk GOF Test**		
333					5% Shapiro Wilk Critical Value	0.935				Data Not Normal at 5% Significance Level		
334					Lilliefors Test Statistic	0.122				**Lilliefors GOF Test**		
335					5% Lilliefors Critical Value	0.145				Data appear Normal at 5% Significance Level		
336	**Data appear Approximate Normal at 5% Significance Level**											
337												
338	**Assuming Normal Distribution**											
339					**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**		
340					95% Student's-t UCL	15.21				95% Adjusted-CLT UCL (Chen-1995)		15.06
341										95% Modified-t UCL (Johnson-1978)		15.19
342												
343	**Gamma GOF Test**											
344					A-D Test Statistic	1.98				**Anderson-Darling Gamma GOF Test**		
345					5% A-D Critical Value	0.747				Data Not Gamma Distributed at 5% Significance Level		
346					K-S Test Statistic	0.163				**Kolmogorov-Smirnov Gamma GOF Test**		
347					5% K-S Critical Value	0.147				Data Not Gamma Distributed at 5% Significance Level		
348	**Data Not Gamma Distributed at 5% Significance Level**											
349												
350	**Gamma Statistics**											
351					k hat (MLE)	16.71				k star (bias corrected MLE)		15.33
352					Theta hat (MLE)	0.859				Theta star (bias corrected MLE)		0.936
353					nu hat (MLE)	1203				nu star (bias corrected)		1104
354					MLE Mean (bias corrected)	14.36				MLE Sd (bias corrected)		3.666
355										Approximate Chi Square Value (0.05)		1028
356					Adjusted Level of Significance	0.0428				Adjusted Chi Square Value		1025
357												
358	**Assuming Gamma Distribution**											
359					95% Approximate Gamma UCL (use when n>=50))	15.42				95% Adjusted Gamma UCL (use when n<50)		15.47
360												
361	**Lognormal GOF Test**											
362					Shapiro Wilk Test Statistic	0.765				**Shapiro Wilk Lognormal GOF Test**		
363					5% Shapiro Wilk Critical Value	0.935				Data Not Lognormal at 5% Significance Level		
364					Lilliefors Test Statistic	0.181				**Lilliefors Lognormal GOF Test**		

365				5% Lilliefors Critical Value		0.145	Data Not Lognormal at 5% Significance Level					
366	**Data Not Lognormal at 5% Significance Level**											
367												
368	**Lognormal Statistics**											
369				Minimum of Logged Data		1.579				Mean of logged Data		2.634
370				Maximum of Logged Data		2.923				SD of logged Data		0.274
371												
372	**Assuming Lognormal Distribution**											
373				95% H-UCL		15.69				90% Chebyshev (MVUE) UCL		16.45
374				95% Chebyshev (MVUE) UCL		17.36				97.5% Chebyshev (MVUE) UCL		18.62
375				99% Chebyshev (MVUE) UCL		21.1						
376												
377	**Nonparametric Distribution Free UCL Statistics**											
378	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
379												
380	**Nonparametric Distribution Free UCLs**											
381				95% CLT UCL		15.19				95% Jackknife UCL		15.21
382				95% Standard Bootstrap UCL		15.18				95% Bootstrap-t UCL		15.09
383				95% Hall's Bootstrap UCL		15.1				95% Percentile Bootstrap UCL		15.11
384				95% BCA Bootstrap UCL		15.08						
385				90% Chebyshev(Mean, Sd) UCL		15.88				95% Chebyshev(Mean, Sd) UCL		16.57
386				97.5% Chebyshev(Mean, Sd) UCL		17.52				99% Chebyshev(Mean, Sd) UCL		19.4
387												
388	**Suggested UCL to Use**											
389				95% Student's-t UCL		15.21						
390												
391	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
392	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
393												
394	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
395	Recommendations are based upon data size, data distribution, and skewness.											
396	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
397	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
398												
399	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
400	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
401												
402	**Val_RADIUM_226**											
403												
404	**General Statistics**											
405				Total Number of Observations		26				Number of Distinct Observations		26
406				Number of Detects		16				Number of Non-Detects		10
407				Number of Distinct Detects		16				Number of Distinct Non-Detects		10
408				Minimum Detect		0.3				Minimum Non-Detect		0.166
409				Maximum Detect		2.77				Maximum Non-Detect		1.98
410				Variance Detects		0.463				Percent Non-Detects		38.46%
411				Mean Detects		1.043				SD Detects		0.68
412				Median Detects		0.817				CV Detects		0.652
413				Skewness Detects		1.029				Kurtosis Detects		1.082
414				Mean of Logged Detects		-0.163				SD of Logged Detects		0.676
415												
416	**Normal GOF Test on Detects Only**											

417					Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**					
418					5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level					
419					Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**					
420					5% Lilliefors Critical Value	0.213	Detected Data appear Normal at 5% Significance Level					
421	**Detected Data appear Approximate Normal at 5% Significance Level**											
422												
423	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
424					KM Mean	0.756	KM Standard Error of Mean					0.139
425					KM SD	0.664	95% KM (BCA) UCL					1.01
426					95% KM (t) UCL	0.993	95% KM (Percentile Bootstrap) UCL					0.991
427					95% KM (z) UCL	0.985	95% KM Bootstrap t UCL					1.037
428					90% KM Chebyshev UCL	1.173	95% KM Chebyshev UCL					1.362
429					97.5% KM Chebyshev UCL	1.624	99% KM Chebyshev UCL					2.139
430												
431	**Gamma GOF Tests on Detected Observations Only**											
432					A-D Test Statistic	0.538	**Anderson-Darling GOF Test**					
433					5% A-D Critical Value	0.747	Detected data appear Gamma Distributed at 5% Significance Level					
434					K-S Test Statistic	0.171	**Kolmogorov-Smirnov GOF**					
435					5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level					
436	**Detected data appear Gamma Distributed at 5% Significance Level**											
437												
438	**Gamma Statistics on Detected Data Only**											
439					k hat (MLE)	2.588	k star (bias corrected MLE)					2.145
440					Theta hat (MLE)	0.403	Theta star (bias corrected MLE)					0.486
441					nu hat (MLE)	82.83	nu star (bias corrected)					68.63
442					Mean (detects)	1.043						
443												
444	**Gamma ROS Statistics using Imputed Non-Detects**											
445	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
446	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
447	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
448	This is especially true when the sample size is small.											
449	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
450					Minimum	0.01	Mean					0.699
451					Maximum	2.77	Median					0.491
452					SD	0.702	CV					1.005
453					k hat (MLE)	0.599	k star (bias corrected MLE)					0.556
454					Theta hat (MLE)	1.166	Theta star (bias corrected MLE)					1.258
455					nu hat (MLE)	31.15	nu star (bias corrected)					28.89
456					Adjusted Level of Significance (β)	0.0398						
457					Approximate Chi Square Value (28.89, α)	17.62	Adjusted Chi Square Value (28.89, β)					17.04
458					95% Gamma Approximate UCL (use when n>=50)	1.146	95% Gamma Adjusted UCL (use when n<50)					1.185
459												
460	**Estimates of Gamma Parameters using KM Estimates**											
461					Mean (KM)	0.756	SD (KM)					0.664
462					Variance (KM)	0.441	SE of Mean (KM)					0.139
463					k hat (KM)	1.295	k star (KM)					1.171
464					nu hat (KM)	67.32	nu star (KM)					60.89
465					theta hat (KM)	0.584	theta star (KM)					0.646
466					80% gamma percentile (KM)	1.2	90% gamma percentile (KM)					1.674
467					95% gamma percentile (KM)	2.143	99% gamma percentile (KM)					3.219
468												

	A	B	C	D	E	F	G	H	I	J	K	L
469	**Gamma Kaplan-Meier (KM) Statistics**											
470	Approximate Chi Square Value (60.89, α)					43.94	Adjusted Chi Square Value (60.89, β)					42.99
471	95% Gamma Approximate KM-UCL (use when n>=50)					1.047	95% Gamma Adjusted KM-UCL (use when n<50)					1.071
472												
473	**Lognormal GOF Test on Detected Observations Only**											
474	Shapiro Wilk Test Statistic					0.933	**Shapiro Wilk GOF Test**					
475	5% Shapiro Wilk Critical Value					0.887	Detected Data appear Lognormal at 5% Significance Level					
476	Lilliefors Test Statistic					0.182	**Lilliefors GOF Test**					
477	5% Lilliefors Critical Value					0.213	Detected Data appear Lognormal at 5% Significance Level					
478	**Detected Data appear Lognormal at 5% Significance Level**											
479												
480	**Lognormal ROS Statistics Using Imputed Non-Detects**											
481	Mean in Original Scale					0.749	Mean in Log Scale					-0.622
482	SD in Original Scale					0.654	SD in Log Scale					0.827
483	95% t UCL (assumes normality of ROS data)					0.968	95% Percentile Bootstrap UCL					0.968
484	95% BCA Bootstrap UCL					1.007	95% Bootstrap t UCL					1.03
485	95% H-UCL (Log ROS)					1.105						
486												
487	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
488	KM Mean (logged)					-0.68	KM Geo Mean					0.507
489	KM SD (logged)					0.917	95% Critical H Value (KM-Log)					2.403
490	KM Standard Error of Mean (logged)					0.195	95% H-UCL (KM -Log)					1.199
491	KM SD (logged)					0.917	95% Critical H Value (KM-Log)					2.403
492	KM Standard Error of Mean (logged)					0.195						
493												
494	**DL/2 Statistics**											
495	**DL/2 Normal**						**DL/2 Log-Transformed**					
496	Mean in Original Scale					0.776	Mean in Log Scale					-0.675
497	SD in Original Scale					0.666	SD in Log Scale					1.015
498	95% t UCL (Assumes normality)					0.999	95% H-Stat UCL					1.423
499	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
500												
501	**Nonparametric Distribution Free UCL Statistics**											
502	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
503												
504	**Suggested UCL to Use**											
505	95% KM (t) UCL					0.993						
506												
507	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
508	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
509												
510	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
511	Recommendations are based upon data size, data distribution, and skewness.											
512	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
513	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
514												
515	**Val_RADIUM_228**											
516												
517	**General Statistics**											
518	Total Number of Observations					62	Number of Distinct Observations					51
519	Number of Detects					53	Number of Non-Detects					9
520	Number of Distinct Detects					42	Number of Distinct Non-Detects					9

521					Minimum Detect	0.282					Minimum Non-Detect	0.181
522					Maximum Detect	1.99					Maximum Non-Detect	0.422
523					Variance Detects	0.11					Percent Non-Detects	14.52%
524					Mean Detects	1.008					SD Detects	0.332
525					Median Detects	1.06					CV Detects	0.329
526					Skewness Detects	-0.109					Kurtosis Detects	0.655
527					Mean of Logged Detects	-0.0594					SD of Logged Detects	0.398
528												
529					**Normal GOF Test on Detects Only**							
530					Shapiro Wilk Test Statistic	0.954	**Normal GOF Test on Detected Observations Only**					
531					5% Shapiro Wilk P Value	0.077	Detected Data appear Normal at 5% Significance Level					
532					Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**					
533					5% Lilliefors Critical Value	0.121	Detected Data Not Normal at 5% Significance Level					
534					**Detected Data appear Approximate Normal at 5% Significance Level**							
535												
536					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
537					KM Mean	0.893	KM Standard Error of Mean					0.053
538					KM SD	0.413	95% KM (BCA) UCL					0.981
539					95% KM (t) UCL	0.981	95% KM (Percentile Bootstrap) UCL					0.983
540					95% KM (z) UCL	0.98	95% KM Bootstrap t UCL					0.979
541					90% KM Chebyshev UCL	1.052	95% KM Chebyshev UCL					1.124
542					97.5% KM Chebyshev UCL	1.224	99% KM Chebyshev UCL					1.421
543												
544					**Gamma GOF Tests on Detected Observations Only**							
545					A-D Test Statistic	1.946	**Anderson-Darling GOF Test**					
546					5% A-D Critical Value	0.752	Detected Data Not Gamma Distributed at 5% Significance Level					
547					K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**					
548					5% K-S Critical Value	0.122	Detected Data Not Gamma Distributed at 5% Significance Level					
549					**Detected Data Not Gamma Distributed at 5% Significance Level**							
550												
551					**Gamma Statistics on Detected Data Only**							
552					k hat (MLE)	7.633	k star (bias corrected MLE)					7.213
553					Theta hat (MLE)	0.132	Theta star (bias corrected MLE)					0.14
554					nu hat (MLE)	809.1	nu star (bias corrected)					764.6
555					Mean (detects)	1.008						
556												
557					**Gamma ROS Statistics using Imputed Non-Detects**							
558					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
559					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
560					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
561					This is especially true when the sample size is small.							
562					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
563					Minimum	0.282	Mean					0.928
564					Maximum	1.99	Median					1.035
565					SD	0.363	CV					0.392
566					k hat (MLE)	5.738	k star (bias corrected MLE)					5.471
567					Theta hat (MLE)	0.162	Theta star (bias corrected MLE)					0.17
568					nu hat (MLE)	711.5	nu star (bias corrected)					678.4
569					Adjusted Level of Significance (β)	0.0461						
570					Approximate Chi Square Value (678.44, α)	619	Adjusted Chi Square Value (678.44, β)					617.7
571					95% Gamma Approximate UCL (use when n>=50)	1.017	95% Gamma Adjusted UCL (use when n<50)					1.019
572												

573	**Estimates of Gamma Parameters using KM Estimates**											
574					Mean (KM)	0.893				SD (KM)		0.413
575					Variance (KM)	0.17				SE of Mean (KM)		0.053
576					k hat (KM)	4.684				k star (KM)		4.468
577					nu hat (KM)	580.8				nu star (KM)		554
578					theta hat (KM)	0.191				theta star (KM)		0.2
579					80% gamma percentile (KM)	1.215				90% gamma percentile (KM)		1.459
580					95% gamma percentile (KM)	1.682				99% gamma percentile (KM)		2.155
581												
582	**Gamma Kaplan-Meier (KM) Statistics**											
583					Approximate Chi Square Value (554.01, α)	500.4				Adjusted Chi Square Value (554.01, β)		499.2
584					95% Gamma Approximate KM-UCL (use when n>=50)	0.988				95% Gamma Adjusted KM-UCL (use when n<50)		0.991
585												
586	**Lognormal GOF Test on Detected Observations Only**											
587					Shapiro Wilk Approximate Test Statistic	0.883				**Shapiro Wilk GOF Test**		
588					5% Shapiro Wilk P Value	2.0503E-5				Detected Data Not Lognormal at 5% Significance Level		
589					Lilliefors Test Statistic	0.2				**Lilliefors GOF Test**		
590					5% Lilliefors Critical Value	0.121				Detected Data Not Lognormal at 5% Significance Level		
591	**Detected Data Not Lognormal at 5% Significance Level**											
592												
593	**Lognormal ROS Statistics Using Imputed Non-Detects**											
594					Mean in Original Scale	0.924				Mean in Log Scale		-0.172
595					SD in Original Scale	0.368				SD in Log Scale		0.459
596					95% t UCL (assumes normality of ROS data)	1.002				95% Percentile Bootstrap UCL		1.002
597					95% BCA Bootstrap UCL	0.998				95% Bootstrap t UCL		1.003
598					95% H-UCL (Log ROS)	1.043						
599												
600	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
601					KM Mean (logged)	-0.277				KM Geo Mean		0.758
602					KM SD (logged)	0.647				95% Critical H Value (KM-Log)		1.965
603					KM Standard Error of Mean (logged)	0.0847				95% H-UCL (KM -Log)		1.1
604					KM SD (logged)	0.647				95% Critical H Value (KM-Log)		1.965
605					KM Standard Error of Mean (logged)	0.0847						
606												
607	**DL/2 Statistics**											
608					**DL/2 Normal**					**DL/2 Log-Transformed**		
609					Mean in Original Scale	0.885				Mean in Log Scale		-0.319
610					SD in Original Scale	0.429				SD in Log Scale		0.74
611					95% t UCL (Assumes normality)	0.976				95% H-Stat UCL		1.159
612	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
613												
614	**Nonparametric Distribution Free UCL Statistics**											
615	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
616												
617	**Suggested UCL to Use**											
618					95% KM (t) UCL	0.981						
619												
620	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
621	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
622												
623	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
624	Recommendations are based upon data size, data distribution, and skewness.											

625	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
626	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
627												
628												
629	**Val_THALLIUM_208**											
630												
631	**General Statistics**											
632					Total Number of Observations	36			Number of Distinct Observations	34		
633									Number of Missing Observations	0		
634					Minimum	0.156			Mean	0.308		
635					Maximum	0.386			Median	0.321		
636					SD	0.0582			Std. Error of Mean	0.00971		
637					Coefficient of Variation	0.189			Skewness	-1.086		
638												
639	**Normal GOF Test**											
640					Shapiro Wilk Test Statistic	0.897			**Shapiro Wilk GOF Test**			
641					5% Shapiro Wilk Critical Value	0.935			Data Not Normal at 5% Significance Level			
642					Lilliefors Test Statistic	0.169			**Lilliefors GOF Test**			
643					5% Lilliefors Critical Value	0.145			Data Not Normal at 5% Significance Level			
644	**Data Not Normal at 5% Significance Level**											
645												
646	**Assuming Normal Distribution**											
647					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
648					95% Student's-t UCL	0.324			95% Adjusted-CLT UCL (Chen-1995)	0.322		
649									95% Modified-t UCL (Johnson-1978)	0.324		
650												
651	**Gamma GOF Test**											
652					A-D Test Statistic	1.825			**Anderson-Darling Gamma GOF Test**			
653					5% A-D Critical Value	0.746			Data Not Gamma Distributed at 5% Significance Level			
654					K-S Test Statistic	0.202			**Kolmogorov-Smirnov Gamma GOF Test**			
655					5% K-S Critical Value	0.147			Data Not Gamma Distributed at 5% Significance Level			
656	**Data Not Gamma Distributed at 5% Significance Level**											
657												
658	**Gamma Statistics**											
659					k hat (MLE)	23.79			k star (bias corrected MLE)	21.83		
660					Theta hat (MLE)	0.0129			Theta star (bias corrected MLE)	0.0141		
661					nu hat (MLE)	1713			nu star (bias corrected)	1572		
662					MLE Mean (bias corrected)	0.308			MLE Sd (bias corrected)	0.0659		
663									Approximate Chi Square Value (0.05)	1481		
664					Adjusted Level of Significance	0.0428			Adjusted Chi Square Value	1477		
665												
666	**Assuming Gamma Distribution**											
667					95% Approximate Gamma UCL (use when n>=50))	0.327			95% Adjusted Gamma UCL (use when n<50)	0.328		
668												
669	**Lognormal GOF Test**											
670					Shapiro Wilk Test Statistic	0.833			**Shapiro Wilk Lognormal GOF Test**			
671					5% Shapiro Wilk Critical Value	0.935			Data Not Lognormal at 5% Significance Level			
672					Lilliefors Test Statistic	0.217			**Lilliefors Lognormal GOF Test**			
673					5% Lilliefors Critical Value	0.145			Data Not Lognormal at 5% Significance Level			
674	**Data Not Lognormal at 5% Significance Level**											
675												
676	**Lognormal Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
677					Minimum of Logged Data	-1.858				Mean of logged Data		-1.199
678					Maximum of Logged Data	-0.952				SD of logged Data		0.22
679												
680	**Assuming Lognormal Distribution**											
681					95% H-UCL	0.329				90% Chebyshev (MVUE) UCL		0.343
682					95% Chebyshev (MVUE) UCL	0.358				97.5% Chebyshev (MVUE) UCL		0.38
683					99% Chebyshev (MVUE) UCL	0.422						
684												
685	**Nonparametric Distribution Free UCL Statistics**											
686	**Data do not follow a Discernible Distribution (0.05)**											
687												
688	**Nonparametric Distribution Free UCLs**											
689					95% CLT UCL	0.324				95% Jackknife UCL		0.324
690					95% Standard Bootstrap UCL	0.323				95% Bootstrap-t UCL		0.322
691					95% Hall's Bootstrap UCL	0.323				95% Percentile Bootstrap UCL		0.323
692					95% BCA Bootstrap UCL	0.322						
693					90% Chebyshev(Mean, Sd) UCL	0.337				95% Chebyshev(Mean, Sd) UCL		0.35
694					97.5% Chebyshev(Mean, Sd) UCL	0.368				99% Chebyshev(Mean, Sd) UCL		0.404
695												
696	**Suggested UCL to Use**											
697					95% Student's-t UCL	0.324				or 95% Modified-t UCL		0.324
698												
699	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
700	Recommendations are based upon data size, data distribution, and skewness.											
701	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
702	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
703												
704	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
705	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
706												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/17/2017 10:53:12 AM								
5			From File	SED532-EstuarineWtld_Sed=0-2_TEQ_Cong_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_TCDD_TEQ**											
12												
13	**General Statistics**											
14					Total Number of Observations	21			Number of Distinct Observations	21		
15									Number of Missing Observations	0		
16					Minimum	2.9163E-7			Mean	1.2750E-5		
17					Maximum	9.7063E-5			Median	5.6924E-6		
18					SD	2.2924E-5			Std. Error of Mean	5.0024E-6		
19					Coefficient of Variation	N/A			Skewness	3.086		
20												
21	**Normal GOF Test**											
22					Shapiro Wilk Test Statistic	0.536			**Shapiro Wilk GOF Test**			
23					5% Shapiro Wilk Critical Value	0.908			Data Not Normal at 5% Significance Level			
24					Lilliefors Test Statistic	0.357			**Lilliefors GOF Test**			
25					5% Lilliefors Critical Value	0.188			Data Not Normal at 5% Significance Level			
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
30					95% Student's-t UCL	2.1378E-5			95% Adjusted-CLT UCL (Chen-1995)	2.4578E-5		
31									95% Modified-t UCL (Johnson-1978)	2.1939E-5		
32												
33	**Gamma GOF Test**											
34					A-D Test Statistic	1.058			**Anderson-Darling Gamma GOF Test**			
35					5% A-D Critical Value	0.791			Data Not Gamma Distributed at 5% Significance Level			
36					K-S Test Statistic	0.217			**Kolmogorov-Smirnov Gamma GOF Test**			
37					5% K-S Critical Value	0.198			Data Not Gamma Distributed at 5% Significance Level			
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41					k hat (MLE)	0.655			k star (bias corrected MLE)	0.593		
42					Theta hat (MLE)	1.9464E-5			Theta star (bias corrected MLE)	2.1493E-5		
43					nu hat (MLE)	27.51			nu star (bias corrected)	24.91		
44					MLE Mean (bias corrected)	1.2750E-5			MLE Sd (bias corrected)	1.6554E-5		
45									Approximate Chi Square Value (0.05)	14.55		
46					Adjusted Level of Significance	0.0383			Adjusted Chi Square Value	13.94		
47												
48	**Assuming Gamma Distribution**											
49					95% Approximate Gamma UCL (use when n>=50))	2.1838E-5			95% Adjusted Gamma UCL (use when n<50)	2.2790E-5		
50												
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.972			**Shapiro Wilk Lognormal GOF Test**			

	A	B	C	D	E	F	G	H	I	J	K	L
53	5% Shapiro Wilk Critical Value					0.908	Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.116	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.188	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					-15.05	Mean of logged Data					-12.2
60	Maximum of Logged Data					-9.24	SD of logged Data					1.36
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					3.2404E-5	90% Chebyshev (MVUE) UCL					2.4107E-5
64	95% Chebyshev (MVUE) UCL					2.9711E-5	97.5% Chebyshev (MVUE) UCL					3.7489E-5
65	99% Chebyshev (MVUE) UCL					5.2767E-5						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					2.0978E-5	95% Jackknife UCL					2.1378E-5
72	95% Standard Bootstrap UCL					2.0624E-5	95% Bootstrap-t UCL					4.5479E-5
73	95% Hall's Bootstrap UCL					5.7104E-5	95% Percentile Bootstrap UCL					2.1553E-5
74	95% BCA Bootstrap UCL					2.5161E-5						
75	90% Chebyshev(Mean, Sd) UCL					2.7757E-5	95% Chebyshev(Mean, Sd) UCL					3.4555E-5
76	97.5% Chebyshev(Mean, Sd) UCL					4.3990E-5	99% Chebyshev(Mean, Sd) UCL					6.2523E-5
77												
78	**Suggested UCL to Use**											
79	95% Chebyshev (Mean, Sd) UCL					3.4555E-5						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												

Paradise Creek Sediment

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/15/2017 11:02:24 AM								
5			From File	SED467-Paradise Creek River Sed_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_ARSENIC**											
12												
13	**General Statistics**											
14					Total Number of Observations	28			Number of Distinct Observations	22		
15									Number of Missing Observations	0		
16					Minimum	2.5			Mean	12.32		
17					Maximum	22.1			Median	12.65		
18					SD	4.263			Std. Error of Mean	0.806		
19					Coefficient of Variation	0.346			Skewness	-0.113		
20												
21	**Normal GOF Test**											
22					Shapiro Wilk Test Statistic	0.901			**Shapiro Wilk GOF Test**			
23					5% Shapiro Wilk Critical Value	0.924			Data Not Normal at 5% Significance Level			
24					Lilliefors Test Statistic	0.209			**Lilliefors GOF Test**			
25					5% Lilliefors Critical Value	0.164			Data Not Normal at 5% Significance Level			
26	**Data Not Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
30					95% Student's-t UCL	13.69			95% Adjusted-CLT UCL (Chen-1995)	13.62		
31									95% Modified-t UCL (Johnson-1978)	13.69		
32												
33	**Gamma GOF Test**											
34					A-D Test Statistic	1.946			**Anderson-Darling Gamma GOF Test**			
35					5% A-D Critical Value	0.748			Data Not Gamma Distributed at 5% Significance Level			
36					K-S Test Statistic	0.274			**Kolmogorov-Smirnov Gamma GOF Test**			
37					5% K-S Critical Value	0.166			Data Not Gamma Distributed at 5% Significance Level			
38	**Data Not Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41					k hat (MLE)	6.239			k star (bias corrected MLE)	5.595		
42					Theta hat (MLE)	1.974			Theta star (bias corrected MLE)	2.201		
43					nu hat (MLE)	349.4			nu star (bias corrected)	313.3		
44					MLE Mean (bias corrected)	12.32			MLE Sd (bias corrected)	5.207		
45									Approximate Chi Square Value (0.05)	273.3		
46					Adjusted Level of Significance	0.0404			Adjusted Chi Square Value	271		
47												
48	**Assuming Gamma Distribution**											
49					95% Approximate Gamma UCL (use when n>=50))	14.12			95% Adjusted Gamma UCL (use when n<50)	14.24		
50												
51	**Lognormal GOF Test**											
52					Shapiro Wilk Test Statistic	0.776			**Shapiro Wilk Lognormal GOF Test**			

53	5% Shapiro Wilk Critical Value					0.924	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.303	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.164	Data Not Lognormal at 5% Significance Level					
56	**Data Not Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					0.916	Mean of logged Data					2.429
60	Maximum of Logged Data					3.096	SD of logged Data					0.467
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					15.03	90% Chebyshev (MVUE) UCL					16.06
64	95% Chebyshev (MVUE) UCL					17.62	97.5% Chebyshev (MVUE) UCL					19.8
65	99% Chebyshev (MVUE) UCL					24.07						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution (0.05)**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					13.64	95% Jackknife UCL					13.69
72	95% Standard Bootstrap UCL					13.61	95% Bootstrap-t UCL					13.74
73	95% Hall's Bootstrap UCL					13.84	95% Percentile Bootstrap UCL					13.56
74	95% BCA Bootstrap UCL					13.58						
75	90% Chebyshev(Mean, Sd) UCL					14.73	95% Chebyshev(Mean, Sd) UCL					15.83
76	97.5% Chebyshev(Mean, Sd) UCL					17.35	99% Chebyshev(Mean, Sd) UCL					20.33
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					13.69	or 95% Modified-t UCL					13.69
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89	**Val_BENZOAPYRENE**											
90												
91	**General Statistics**											
92	Total Number of Observations					28	Number of Distinct Observations					25
93	Number of Detects					19	Number of Non-Detects					9
94	Number of Distinct Detects					17	Number of Distinct Non-Detects					8
95	Minimum Detect					0.18	Minimum Non-Detect					0.27
96	Maximum Detect					1.6	Maximum Non-Detect					0.53
97	Variance Detects					0.135	Percent Non-Detects					32.14%
98	Mean Detects					0.568	SD Detects					0.368
99	Median Detects					0.4	CV Detects					0.647
100	Skewness Detects					1.676	Kurtosis Detects					2.461
101	Mean of Logged Detects					-0.723	SD of Logged Detects					0.554
102												
103	**Normal GOF Test on Detects Only**											
104	Shapiro Wilk Test Statistic					0.804	**Shapiro Wilk GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
105					5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level					
106					Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**					
107					5% Lilliefors Critical Value	0.197	Detected Data Not Normal at 5% Significance Level					
108	**Detected Data Not Normal at 5% Significance Level**											
109												
110	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
111					KM Mean	0.473				KM Standard Error of Mean		0.0647
112					KM SD	0.329				95% KM (BCA) UCL		0.601
113					95% KM (t) UCL	0.583				95% KM (Percentile Bootstrap) UCL		0.59
114					95% KM (z) UCL	0.579				95% KM Bootstrap t UCL		0.607
115					90% KM Chebyshev UCL	0.667				95% KM Chebyshev UCL		0.755
116					97.5% KM Chebyshev UCL	0.877				99% KM Chebyshev UCL		1.117
117												
118	**Gamma GOF Tests on Detected Observations Only**											
119					A-D Test Statistic	0.753	**Anderson-Darling GOF Test**					
120					5% A-D Critical Value	0.747	Detected Data Not Gamma Distributed at 5% Significance Level					
121					K-S Test Statistic	0.19	**Kolmogorov-Smirnov GOF**					
122					5% K-S Critical Value	0.2	Detected data appear Gamma Distributed at 5% Significance Level					
123	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
124												
125	**Gamma Statistics on Detected Data Only**											
126					k hat (MLE)	3.32				k star (bias corrected MLE)		2.831
127					Theta hat (MLE)	0.171				Theta star (bias corrected MLE)		0.201
128					nu hat (MLE)	126.1				nu star (bias corrected)		107.6
129					Mean (detects)	0.568						
130												
131	**Gamma ROS Statistics using Imputed Non-Detects**											
132	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
133	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
134	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
135	This is especially true when the sample size is small.											
136	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
137					Minimum	0.01				Mean		0.443
138					Maximum	1.6				Median		0.345
139					SD	0.357				CV		0.808
140					k hat (MLE)	1.666				k star (bias corrected MLE)		1.511
141					Theta hat (MLE)	0.266				Theta star (bias corrected MLE)		0.293
142					nu hat (MLE)	93.29				nu star (bias corrected)		84.63
143					Adjusted Level of Significance (β)	0.0404						
144					Approximate Chi Square Value (84.63, α)	64.42				Adjusted Chi Square Value (84.63, β)		63.33
145					95% Gamma Approximate UCL (use when n>=50)	0.581				95% Gamma Adjusted UCL (use when n<50)		0.591
146												
147	**Estimates of Gamma Parameters using KM Estimates**											
148					Mean (KM)	0.473				SD (KM)		0.329
149					Variance (KM)	0.108				SE of Mean (KM)		0.0647
150					k hat (KM)	2.061				k star (KM)		1.864
151					nu hat (KM)	115.4				nu star (KM)		104.4
152					theta hat (KM)	0.229				theta star (KM)		0.254
153					80% gamma percentile (KM)	0.714				90% gamma percentile (KM)		0.935
154					95% gamma percentile (KM)	1.147				99% gamma percentile (KM)		1.619
155												
156	**Gamma Kaplan-Meier (KM) Statistics**											

157	Approximate Chi Square Value (104.40, α)					81.82	Adjusted Chi Square Value (104.40, β)					80.58
158	95% Gamma Approximate KM-UCL (use when n>=50)					0.603	95% Gamma Adjusted KM-UCL (use when n<50)					0.613
159												
160	**Lognormal GOF Test on Detected Observations Only**											
161	Shapiro Wilk Test Statistic					0.951	**Shapiro Wilk GOF Test**					
162	5% Shapiro Wilk Critical Value					0.901	Detected Data appear Lognormal at 5% Significance Level					
163	Lilliefors Test Statistic					0.162	**Lilliefors GOF Test**					
164	5% Lilliefors Critical Value					0.197	Detected Data appear Lognormal at 5% Significance Level					
165	**Detected Data appear Lognormal at 5% Significance Level**											
166												
167	**Lognormal ROS Statistics Using Imputed Non-Detects**											
168	Mean in Original Scale					0.468	Mean in Log Scale					-0.938
169	SD in Original Scale					0.337	SD in Log Scale					0.569
170	95% t UCL (assumes normality of ROS data)					0.576	95% Percentile Bootstrap UCL					0.579
171	95% BCA Bootstrap UCL					0.604	95% Bootstrap t UCL					0.639
172	95% H-UCL (Log ROS)					0.573						
173												
174	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
175	KM Mean (logged)					-0.925	KM Geo Mean					0.396
176	KM SD (logged)					0.561	95% Critical H Value (KM-Log)					1.993
177	KM Standard Error of Mean (logged)					0.115	95% H-UCL (KM -Log)					0.575
178	KM SD (logged)					0.561	95% Critical H Value (KM-Log)					1.993
179	KM Standard Error of Mean (logged)					0.115						
180												
181	**DL/2 Statistics**											
182	**DL/2 Normal**						**DL/2 Log-Transformed**					
183	Mean in Original Scale					0.449	Mean in Log Scale					-1.022
184	SD in Original Scale					0.349	SD in Log Scale					0.645
185	95% t UCL (Assumes normality)					0.561	95% H-Stat UCL					0.573
186	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
187												
188	**Nonparametric Distribution Free UCL Statistics**											
189	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**											
190												
191	**Suggested UCL to Use**											
192	95% KM Adjusted Gamma UCL					0.613	95% GROS Adjusted Gamma UCL					0.591
193												
194	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
195	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
196												
197	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
198	Recommendations are based upon data size, data distribution, and skewness.											
199	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
200	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
201												
202												
203	**Val_CHROMIUM**											
204												
205	**General Statistics**											
206	Total Number of Observations					28	Number of Distinct Observations					28
207							Number of Missing Observations					0
208	Minimum					12.1	Mean					191.3

209					Maximum	1110					Median	90.55
210					SD	271.5					Std. Error of Mean	51.31
211					Coefficient of Variation	1.419					Skewness	2.636
212												
213	**Normal GOF Test**											
214					Shapiro Wilk Test Statistic	0.612	**Shapiro Wilk GOF Test**					
215					5% Shapiro Wilk Critical Value	0.924	Data Not Normal at 5% Significance Level					
216					Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**					
217					5% Lilliefors Critical Value	0.164	Data Not Normal at 5% Significance Level					
218	**Data Not Normal at 5% Significance Level**											
219												
220	**Assuming Normal Distribution**											
221	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
222					95% Student's-t UCL	278.6					95% Adjusted-CLT UCL (Chen-1995)	303
223											95% Modified-t UCL (Johnson-1978)	282.9
224												
225	**Gamma GOF Test**											
226					A-D Test Statistic	1.124	**Anderson-Darling Gamma GOF Test**					
227					5% A-D Critical Value	0.777	Data Not Gamma Distributed at 5% Significance Level					
228					K-S Test Statistic	0.185	**Kolmogorov-Smirnov Gamma GOF Test**					
229					5% K-S Critical Value	0.171	Data Not Gamma Distributed at 5% Significance Level					
230	**Data Not Gamma Distributed at 5% Significance Level**											
231												
232	**Gamma Statistics**											
233					k hat (MLE)	0.921					k star (bias corrected MLE)	0.846
234					Theta hat (MLE)	207.6					Theta star (bias corrected MLE)	225.9
235					nu hat (MLE)	51.6					nu star (bias corrected)	47.4
236					MLE Mean (bias corrected)	191.3					MLE Sd (bias corrected)	207.9
237											Approximate Chi Square Value (0.05)	32.6
238					Adjusted Level of Significance	0.0404					Adjusted Chi Square Value	31.84
239												
240	**Assuming Gamma Distribution**											
241					95% Approximate Gamma UCL (use when n>=50))	278.1					95% Adjusted Gamma UCL (use when n<50)	284.7
242												
243	**Lognormal GOF Test**											
244					Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**					
245					5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level					
246					Lilliefors Test Statistic	0.0992	**Lilliefors Lognormal GOF Test**					
247					5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level					
248	**Data appear Lognormal at 5% Significance Level**											
249												
250	**Lognormal Statistics**											
251					Minimum of Logged Data	2.493					Mean of logged Data	4.621
252					Maximum of Logged Data	7.012					SD of logged Data	1.099
253												
254	**Assuming Lognormal Distribution**											
255					95% H-UCL	320.5					90% Chebyshev (MVUE) UCL	310.5
256					95% Chebyshev (MVUE) UCL	369.7					97.5% Chebyshev (MVUE) UCL	451.8
257					99% Chebyshev (MVUE) UCL	613.2						
258												
259	**Nonparametric Distribution Free UCL Statistics**											
260	**Data appear to follow a Discernible Distribution at 5% Significance Level**											

261												
262	**Nonparametric Distribution Free UCLs**											
263					95% CLT UCL	275.6			95% Jackknife UCL	278.6		
264					95% Standard Bootstrap UCL	274.4			95% Bootstrap-t UCL	398.1		
265					95% Hall's Bootstrap UCL	619.3			95% Percentile Bootstrap UCL	276.7		
266					95% BCA Bootstrap UCL	313.7						
267					90% Chebyshev(Mean, Sd) UCL	345.2			95% Chebyshev(Mean, Sd) UCL	414.9		
268					97.5% Chebyshev(Mean, Sd) UCL	511.7			99% Chebyshev(Mean, Sd) UCL	701.7		
269												
270	**Suggested UCL to Use**											
271					95% H-UCL	320.5						
272												
273	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
274	Recommendations are based upon data size, data distribution, and skewness.											
275	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
276	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
277												
278	**ProUCL computes and outputs H-statistic based UCLs for historical reasons only.**											
279	**H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.**											
280	**It is therefore recommended to avoid the use of H-statistic based 95% UCLs.**											
281	**Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.**											
282												
283												
284	**Val_COBALT**											
285												
286	**General Statistics**											
287					Total Number of Observations	28			Number of Distinct Observations	28		
288									Number of Missing Observations	0		
289					Minimum	0.45			Mean	105.5		
290					Maximum	612			Median	35.05		
291					SD	154.4			Std. Error of Mean	29.18		
292					Coefficient of Variation	1.463			Skewness	2.146		
293												
294	**Normal GOF Test**											
295					Shapiro Wilk Test Statistic	0.669			**Shapiro Wilk GOF Test**			
296					5% Shapiro Wilk Critical Value	0.924			Data Not Normal at 5% Significance Level			
297					Lilliefors Test Statistic	0.299			**Lilliefors GOF Test**			
298					5% Lilliefors Critical Value	0.164			Data Not Normal at 5% Significance Level			
299	**Data Not Normal at 5% Significance Level**											
300												
301	**Assuming Normal Distribution**											
302	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
303					95% Student's-t UCL	155.2			95% Adjusted-CLT UCL (Chen-1995)	166.2		
304									95% Modified-t UCL (Johnson-1978)	157.2		
305												
306	**Gamma GOF Test**											
307					A-D Test Statistic	0.643			**Anderson-Darling Gamma GOF Test**			
308					5% A-D Critical Value	0.797			Detected data appear Gamma Distributed at 5% Significance Level			
309					K-S Test Statistic	0.144			**Kolmogorov-Smirnov Gamma GOF Test**			
310					5% K-S Critical Value	0.173			Detected data appear Gamma Distributed at 5% Significance Level			
311	**Detected data appear Gamma Distributed at 5% Significance Level**											
312												

313	**Gamma Statistics**											
314					k hat (MLE)	0.632			k star (bias corrected MLE)			0.589
315					Theta hat (MLE)	166.9			Theta star (bias corrected MLE)			179.3
316					nu hat (MLE)	35.42			nu star (bias corrected)			32.96
317					MLE Mean (bias corrected)	105.5			MLE Sd (bias corrected)			137.6
318									Approximate Chi Square Value (0.05)			20.83
319					Adjusted Level of Significance	0.0404			Adjusted Chi Square Value			20.24
320												
321	**Assuming Gamma Distribution**											
322				95% Approximate Gamma UCL (use when n>=50)		166.9			95% Adjusted Gamma UCL (use when n<50)			171.9
323												
324	**Lognormal GOF Test**											
325					Shapiro Wilk Test Statistic	0.967			**Shapiro Wilk Lognormal GOF Test**			
326					5% Shapiro Wilk Critical Value	0.924			Data appear Lognormal at 5% Significance Level			
327					Lilliefors Test Statistic	0.0927			**Lilliefors Lognormal GOF Test**			
328					5% Lilliefors Critical Value	0.164			Data appear Lognormal at 5% Significance Level			
329	**Data appear Lognormal at 5% Significance Level**											
330												
331	**Lognormal Statistics**											
332					Minimum of Logged Data	-0.799			Mean of logged Data			3.69
333					Maximum of Logged Data	6.417			SD of logged Data			1.59
334												
335	**Assuming Lognormal Distribution**											
336					95% H-UCL	384.8			90% Chebyshev (MVUE) UCL			277.3
337					95% Chebyshev (MVUE) UCL	344.3			97.5% Chebyshev (MVUE) UCL			437.3
338					99% Chebyshev (MVUE) UCL	619.9						
339												
340	**Nonparametric Distribution Free UCL Statistics**											
341	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
342												
343	**Nonparametric Distribution Free UCLs**											
344					95% CLT UCL	153.5			95% Jackknife UCL			155.2
345					95% Standard Bootstrap UCL	152.7			95% Bootstrap-t UCL			181.8
346					95% Hall's Bootstrap UCL	161.4			95% Percentile Bootstrap UCL			157.4
347					95% BCA Bootstrap UCL	167.7						
348					90% Chebyshev(Mean, Sd) UCL	193.1			95% Chebyshev(Mean, Sd) UCL			232.7
349					97.5% Chebyshev(Mean, Sd) UCL	287.8			99% Chebyshev(Mean, Sd) UCL			395.9
350												
351	**Suggested UCL to Use**											
352					95% Adjusted Gamma UCL	171.9						
353												
354	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
355	Recommendations are based upon data size, data distribution, and skewness.											
356	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
357	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
358												
359	**Val_THALLIUM**											
360												
361	**General Statistics**											
362					Total Number of Observations	28			Number of Distinct Observations			22
363					Number of Detects	20			Number of Non-Detects			8
364					Number of Distinct Detects	14			Number of Distinct Non-Detects			8

365					Minimum Detect	0.31					Minimum Non-Detect	3.5
366					Maximum Detect	2					Maximum Non-Detect	6.9
367					Variance Detects	0.188					Percent Non-Detects	28.57%
368					Mean Detects	1.4					SD Detects	0.434
369					Median Detects	1.475					CV Detects	0.31
370					Skewness Detects	-1.174					Kurtosis Detects	1.256
371					Mean of Logged Detects	0.262					SD of Logged Detects	0.452
372												
373					**Normal GOF Test on Detects Only**							
374					Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**					
375					5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level					
376					Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**					
377					5% Lilliefors Critical Value	0.192	Detected Data Not Normal at 5% Significance Level					
378					**Detected Data Not Normal at 5% Significance Level**							
379												
380					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
381					KM Mean	1.4	KM Standard Error of Mean	0.0971				
382					KM SD	0.423	95% KM (BCA) UCL	1.545				
383					95% KM (t) UCL	1.565	95% KM (Percentile Bootstrap) UCL	1.55				
384					95% KM (z) UCL	1.559	95% KM Bootstrap t UCL	1.551				
385					90% KM Chebyshev UCL	1.691	95% KM Chebyshev UCL	1.823				
386					97.5% KM Chebyshev UCL	2.006	99% KM Chebyshev UCL	2.365				
387												
388					**Gamma GOF Tests on Detected Observations Only**							
389					A-D Test Statistic	1.662	**Anderson-Darling GOF Test**					
390					5% A-D Critical Value	0.744	Detected Data Not Gamma Distributed at 5% Significance Level					
391					K-S Test Statistic	0.274	**Kolmogorov-Smirnov GOF**					
392					5% K-S Critical Value	0.194	Detected Data Not Gamma Distributed at 5% Significance Level					
393					**Detected Data Not Gamma Distributed at 5% Significance Level**							
394												
395					**Gamma Statistics on Detected Data Only**							
396					k hat (MLE)	6.933	k star (bias corrected MLE)	5.927				
397					Theta hat (MLE)	0.202	Theta star (bias corrected MLE)	0.236				
398					nu hat (MLE)	277.3	nu star (bias corrected)	237.1				
399					Mean (detects)	1.4						
400												
401					**Gamma ROS Statistics using Imputed Non-Detects**							
402					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
403					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
404					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
405					This is especially true when the sample size is small.							
406					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
407					Minimum	0.31	Mean	1.387				
408					Maximum	2	Median	1.379				
409					SD	0.365	CV	0.263				
410					k hat (MLE)	9.626	k star (bias corrected MLE)	8.618				
411					Theta hat (MLE)	0.144	Theta star (bias corrected MLE)	0.161				
412					nu hat (MLE)	539	nu star (bias corrected)	482.6				
413					Adjusted Level of Significance (β)	0.0404						
414					Approximate Chi Square Value (482.62, α)	432.7	Adjusted Chi Square Value (482.62, β)	429.8				
415					95% Gamma Approximate UCL (use when n>=50)	1.548	95% Gamma Adjusted UCL (use when n<50)	1.558				
416												

	A	B	C	D	E	F	G	H	I	J	K	L
417	**Estimates of Gamma Parameters using KM Estimates**											
418					Mean (KM)	1.4					SD (KM)	0.423
419					Variance (KM)	0.179					SE of Mean (KM)	0.0971
420					k hat (KM)	10.94					k star (KM)	9.789
421					nu hat (KM)	612.5					nu star (KM)	548.2
422					theta hat (KM)	0.128					theta star (KM)	0.143
423					80% gamma percentile (KM)	1.755					90% gamma percentile (KM)	1.995
424					95% gamma percentile (KM)	2.207					99% gamma percentile (KM)	2.644
425												
426	**Gamma Kaplan-Meier (KM) Statistics**											
427					Approximate Chi Square Value (548.20, α)	494.9					Adjusted Chi Square Value (548.20, β)	491.8
428					95% Gamma Approximate KM-UCL (use when n>=50)	1.55					95% Gamma Adjusted KM-UCL (use when n<50)	1.56
429												
430	**Lognormal GOF Test on Detected Observations Only**											
431					Shapiro Wilk Test Statistic	0.734					**Shapiro Wilk GOF Test**	
432					5% Shapiro Wilk Critical Value	0.905					Detected Data Not Lognormal at 5% Significance Level	
433					Lilliefors Test Statistic	0.3					**Lilliefors GOF Test**	
434					5% Lilliefors Critical Value	0.192					Detected Data Not Lognormal at 5% Significance Level	
435	**Detected Data Not Lognormal at 5% Significance Level**											
436												
437	**Lognormal ROS Statistics Using Imputed Non-Detects**											
438					Mean in Original Scale	1.371					Mean in Log Scale	0.262
439					SD in Original Scale	0.367					SD in Log Scale	0.379
440					95% t UCL (assumes normality of ROS data)	1.489					95% Percentile Bootstrap UCL	1.484
441					95% BCA Bootstrap UCL	1.47					95% Bootstrap t UCL	1.479
442					95% H-UCL (Log ROS)	1.599						
443												
444	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
445					KM Mean (logged)	0.262					KM Geo Mean	1.3
446					KM SD (logged)	0.441					95% Critical H Value (KM-Log)	1.896
447					KM Standard Error of Mean (logged)	0.101					95% H-UCL (KM -Log)	1.683
448					KM SD (logged)	0.441					95% Critical H Value (KM-Log)	1.896
449					KM Standard Error of Mean (logged)	0.101						
450												
451	**DL/2 Statistics**											
452	**DL/2 Normal**						**DL/2 Log-Transformed**					
453					Mean in Original Scale	1.714					Mean in Log Scale	0.441
454					SD in Original Scale	0.705					SD in Log Scale	0.493
455					95% t UCL (Assumes normality)	1.941					95% H-Stat UCL	2.11
456	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
457												
458	**Nonparametric Distribution Free UCL Statistics**											
459	**Data do not follow a Discernible Distribution at 5% Significance Level**											
460												
461	**Suggested UCL to Use**											
462					95% KM (t) UCL	1.565					KM H-UCL	1.683
463					95% KM (BCA) UCL	1.545						
464												
465	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
466	Recommendations are based upon data size, data distribution, and skewness.											
467	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
468	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
469												
470	**Val_44__DDE**											
471												
472	**General Statistics**											
473					Total Number of Observations	28			Number of Distinct Observations			25
474					Number of Detects	11			Number of Non-Detects			17
475					Number of Distinct Detects	10			Number of Distinct Non-Detects			15
476					Minimum Detect	0.011			Minimum Non-Detect			0.00519
477					Maximum Detect	0.0626			Maximum Non-Detect			0.0102
478					Variance Detects	2.2476E-4			Percent Non-Detects			60.71%
479					Mean Detects	0.0277			SD Detects			0.015
480					Median Detects	0.023			CV Detects			0.54
481					Skewness Detects	1.257			Kurtosis Detects			1.828
482					Mean of Logged Detects	-3.708			SD of Logged Detects			0.519
483												
484	**Normal GOF Test on Detects Only**											
485					Shapiro Wilk Test Statistic	0.894			**Shapiro Wilk GOF Test**			
486					5% Shapiro Wilk Critical Value	0.85			Detected Data appear Normal at 5% Significance Level			
487					Lilliefors Test Statistic	0.17			**Lilliefors GOF Test**			
488					5% Lilliefors Critical Value	0.251			Detected Data appear Normal at 5% Significance Level			
489	**Detected Data appear Normal at 5% Significance Level**											
490												
491	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
492					KM Mean	0.014			KM Standard Error of Mean			0.00281
493					KM SD	0.0142			95% KM (BCA) UCL			0.019
494					95% KM (t) UCL	0.0188			95% KM (Percentile Bootstrap) UCL			0.0189
495					95% KM (z) UCL	0.0187			95% KM Bootstrap t UCL			0.0202
496					90% KM Chebyshev UCL	0.0225			95% KM Chebyshev UCL			0.0263
497					97.5% KM Chebyshev UCL	0.0316			99% KM Chebyshev UCL			0.042
498												
499	**Gamma GOF Tests on Detected Observations Only**											
500					A-D Test Statistic	0.233			**Anderson-Darling GOF Test**			
501					5% A-D Critical Value	0.732			Detected data appear Gamma Distributed at 5% Significance Level			
502					K-S Test Statistic	0.135			**Kolmogorov-Smirnov GOF**			
503					5% K-S Critical Value	0.256			Detected data appear Gamma Distributed at 5% Significance Level			
504	**Detected data appear Gamma Distributed at 5% Significance Level**											
505												
506	**Gamma Statistics on Detected Data Only**											
507					k hat (MLE)	4.213			k star (bias corrected MLE)			3.124
508					Theta hat (MLE)	0.00659			Theta star (bias corrected MLE)			0.00888
509					nu hat (MLE)	92.68			nu star (bias corrected)			68.74
510					Mean (detects)	0.0277						
511												
512	**Gamma ROS Statistics using Imputed Non-Detects**											
513	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
514	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
515	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
516	This is especially true when the sample size is small.											
517	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
518					Minimum	0.01			Mean			0.017
519					Maximum	0.0626			Median			0.01
520					SD	0.0127			CV			0.748

521					k hat (MLE)	2.99				k star (bias corrected MLE)		2.693
522					Theta hat (MLE)	0.00568				Theta star (bias corrected MLE)		0.0063
523					nu hat (MLE)	167.4				nu star (bias corrected)		150.8
524					Adjusted Level of Significance (β)	0.0404						
525					Approximate Chi Square Value (150.82, α)	123.4				Adjusted Chi Square Value (150.82, β)		121.9
526					95% Gamma Approximate UCL (use when n>=50)	0.0207				95% Gamma Adjusted UCL (use when n<50)		0.021
527												
528					**Estimates of Gamma Parameters using KM Estimates**							
529					Mean (KM)	0.014				SD (KM)		0.0142
530					Variance (KM)	2.0161E-4				SE of Mean (KM)		0.00281
531					k hat (KM)	0.979				k star (KM)		0.898
532					nu hat (KM)	54.81				nu star (KM)		50.27
533					theta hat (KM)	0.0144				theta star (KM)		0.0156
534					80% gamma percentile (KM)	0.0228				90% gamma percentile (KM)		0.0332
535					95% gamma percentile (KM)	0.0437				99% gamma percentile (KM)		0.0683
536												
537					**Gamma Kaplan-Meier (KM) Statistics**							
538					Approximate Chi Square Value (50.27, α)	34.99				Adjusted Chi Square Value (50.27, β)		34.2
539					95% Gamma Approximate KM-UCL (use when n>=50)	0.0202				95% Gamma Adjusted KM-UCL (use when n<50)		0.0206
540												
541					**Lognormal GOF Test on Detected Observations Only**							
542					Shapiro Wilk Test Statistic	0.976				**Shapiro Wilk GOF Test**		
543					5% Shapiro Wilk Critical Value	0.85				Detected Data appear Lognormal at 5% Significance Level		
544					Lilliefors Test Statistic	0.117				**Lilliefors GOF Test**		
545					5% Lilliefors Critical Value	0.251				Detected Data appear Lognormal at 5% Significance Level		
546					**Detected Data appear Lognormal at 5% Significance Level**							
547												
548					**Lognormal ROS Statistics Using Imputed Non-Detects**							
549					Mean in Original Scale	0.014				Mean in Log Scale		-4.671
550					SD in Original Scale	0.0145				SD in Log Scale		0.858
551					95% t UCL (assumes normality of ROS data)	0.0187				95% Percentile Bootstrap UCL		0.0187
552					95% BCA Bootstrap UCL	0.0194				95% Bootstrap t UCL		0.0204
553					95% H-UCL (Log ROS)	0.0198						
554												
555					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
556					KM Mean (logged)	-4.651				KM Geo Mean		0.00955
557					KM SD (logged)	0.82				95% Critical H Value (KM-Log)		2.246
558					KM Standard Error of Mean (logged)	0.162				95% H-UCL (KM -Log)		0.019
559					KM SD (logged)	0.82				95% Critical H Value (KM-Log)		2.246
560					KM Standard Error of Mean (logged)	0.162						
561												
562					**DL/2 Statistics**							
563					**DL/2 Normal**					**DL/2 Log-Transformed**		
564					Mean in Original Scale	0.0133				Mean in Log Scale		-4.834
565					SD in Original Scale	0.015				SD in Log Scale		0.987
566					95% t UCL (Assumes normality)	0.0181				95% H-Stat UCL		0.0206
567					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
568												
569					**Nonparametric Distribution Free UCL Statistics**							
570					**Detected Data appear Normal Distributed at 5% Significance Level**							
571												
572					**Suggested UCL to Use**							

573					95% KM (t) UCL	0.0188						
574												
575	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
576	Recommendations are based upon data size, data distribution, and skewness.											
577	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
578	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
579												
580	**Val_ZINC**											
581												
582	**General Statistics**											
583					Total Number of Observations	28			Number of Distinct Observations	27		
584									Number of Missing Observations	0		
585					Minimum	61.4			Mean	459.1		
586					Maximum	1480			Median	442		
587					SD	293.1			Std. Error of Mean	55.38		
588					Coefficient of Variation	0.638			Skewness	1.721		
589												
590	**Normal GOF Test**											
591					Shapiro Wilk Test Statistic	0.853			**Shapiro Wilk GOF Test**			
592					5% Shapiro Wilk Critical Value	0.924			Data Not Normal at 5% Significance Level			
593					Lilliefors Test Statistic	0.186			**Lilliefors GOF Test**			
594					5% Lilliefors Critical Value	0.164			Data Not Normal at 5% Significance Level			
595	**Data Not Normal at 5% Significance Level**											
596												
597	**Assuming Normal Distribution**											
598	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
599					95% Student's-t UCL	553.5			95% Adjusted-CLT UCL (Chen-1995)	569.5		
600									95% Modified-t UCL (Johnson-1978)	556.5		
601												
602	**Gamma GOF Test**											
603					A-D Test Statistic	0.508			**Anderson-Darling Gamma GOF Test**			
604					5% A-D Critical Value	0.755			Detected data appear Gamma Distributed at 5% Significance Level			
605					K-S Test Statistic	0.136			**Kolmogorov-Smirnov Gamma GOF Test**			
606					5% K-S Critical Value	0.167			Detected data appear Gamma Distributed at 5% Significance Level			
607	**Detected data appear Gamma Distributed at 5% Significance Level**											
608												
609	**Gamma Statistics**											
610					k hat (MLE)	2.702			k star (bias corrected MLE)	2.436		
611					Theta hat (MLE)	170			Theta star (bias corrected MLE)	188.5		
612					nu hat (MLE)	151.3			nu star (bias corrected)	136.4		
613					MLE Mean (bias corrected)	459.1			MLE Sd (bias corrected)	294.2		
614									Approximate Chi Square Value (0.05)	110.4		
615					Adjusted Level of Significance	0.0404			Adjusted Chi Square Value	109		
616												
617	**Assuming Gamma Distribution**											
618					95% Approximate Gamma UCL (use when n>=50)	567.2			95% Adjusted Gamma UCL (use when n<50)	574.7		
619												
620	**Lognormal GOF Test**											
621					Shapiro Wilk Test Statistic	0.948			**Shapiro Wilk Lognormal GOF Test**			
622					5% Shapiro Wilk Critical Value	0.924			Data appear Lognormal at 5% Significance Level			
623					Lilliefors Test Statistic	0.174			**Lilliefors Lognormal GOF Test**			
624					5% Lilliefors Critical Value	0.164			Data Not Lognormal at 5% Significance Level			

625	**Data appear Approximate Lognormal at 5% Significance Level**											
626												
627	**Lognormal Statistics**											
628					Minimum of Logged Data	4.117			Mean of logged Data	5.933		
629					Maximum of Logged Data	7.3			SD of logged Data	0.677		
630												
631	**Assuming Lognormal Distribution**											
632					95% H-UCL	624			90% Chebyshev (MVUE) UCL	664		
633					95% Chebyshev (MVUE) UCL	751.9			97.5% Chebyshev (MVUE) UCL	873.8		
634					99% Chebyshev (MVUE) UCL	1113						
635												
636	**Nonparametric Distribution Free UCL Statistics**											
637	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
638												
639	**Nonparametric Distribution Free UCLs**											
640					95% CLT UCL	550.2			95% Jackknife UCL	553.5		
641					95% Standard Bootstrap UCL	549.2			95% Bootstrap-t UCL	584.5		
642					95% Hall's Bootstrap UCL	631.4			95% Percentile Bootstrap UCL	556.8		
643					95% BCA Bootstrap UCL	572.1						
644					90% Chebyshev(Mean, Sd) UCL	625.3			95% Chebyshev(Mean, Sd) UCL	700.6		
645					97.5% Chebyshev(Mean, Sd) UCL	805			99% Chebyshev(Mean, Sd) UCL	1010		
646												
647	**Suggested UCL to Use**											
648					95% Adjusted Gamma UCL	574.7						
649												
650	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
651	Recommendations are based upon data size, data distribution, and skewness.											
652	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
653	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
654												
655	**Val_COPPER**											
656												
657	**General Statistics**											
658					Total Number of Observations	28			Number of Distinct Observations	27		
659									Number of Missing Observations	0		
660					Minimum	30.6			Mean	127.9		
661					Maximum	398			Median	132.5		
662					SD	79.28			Std. Error of Mean	14.98		
663					Coefficient of Variation	0.62			Skewness	1.47		
664												
665	**Normal GOF Test**											
666					Shapiro Wilk Test Statistic	0.878			**Shapiro Wilk GOF Test**			
667					5% Shapiro Wilk Critical Value	0.924			Data Not Normal at 5% Significance Level			
668					Lilliefors Test Statistic	0.176			**Lilliefors GOF Test**			
669					5% Lilliefors Critical Value	0.164			Data Not Normal at 5% Significance Level			
670	**Data Not Normal at 5% Significance Level**											
671												
672	**Assuming Normal Distribution**											
673	**95% Normal UCL**								**95% UCLs (Adjusted for Skewness)**			
674					95% Student's-t UCL	153.5			95% Adjusted-CLT UCL (Chen-1995)	157		
675									95% Modified-t UCL (Johnson-1978)	154.2		
676												

	A	B	C	D	E	F	G	H	I	J	K	L
677	**Gamma GOF Test**											
678					A-D Test Statistic	0.503	**Anderson-Darling Gamma GOF Test**					
679					5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level					
680					K-S Test Statistic	0.133	**Kolmogorov-Smirnov Gamma GOF Test**					
681					5% K-S Critical Value	0.167	Detected data appear Gamma Distributed at 5% Significance Level					
682	**Detected data appear Gamma Distributed at 5% Significance Level**											
683												
684	**Gamma Statistics**											
685					k hat (MLE)	2.804	k star (bias corrected MLE)					2.527
686					Theta hat (MLE)	45.63	Theta star (bias corrected MLE)					50.62
687					nu hat (MLE)	157	nu star (bias corrected)					141.5
688					MLE Mean (bias corrected)	127.9	MLE Sd (bias corrected)					80.48
689							Approximate Chi Square Value (0.05)					115
690					Adjusted Level of Significance	0.0404	Adjusted Chi Square Value					113.6
691												
692	**Assuming Gamma Distribution**											
693				95% Approximate Gamma UCL (use when n>=50)		157.4	95% Adjusted Gamma UCL (use when n<50)					159.4
694												
695	**Lognormal GOF Test**											
696					Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**					
697					5% Shapiro Wilk Critical Value	0.924	Data appear Lognormal at 5% Significance Level					
698					Lilliefors Test Statistic	0.161	**Lilliefors Lognormal GOF Test**					
699					5% Lilliefors Critical Value	0.164	Data appear Lognormal at 5% Significance Level					
700	**Data appear Lognormal at 5% Significance Level**											
701												
702	**Lognormal Statistics**											
703					Minimum of Logged Data	3.421	Mean of logged Data					4.663
704					Maximum of Logged Data	5.986	SD of logged Data					0.654
705												
706	**Assuming Lognormal Distribution**											
707					95% H-UCL	170.3	90% Chebyshev (MVUE) UCL					181.5
708					95% Chebyshev (MVUE) UCL	204.9	97.5% Chebyshev (MVUE) UCL					237.3
709					99% Chebyshev (MVUE) UCL	301						
710												
711	**Nonparametric Distribution Free UCL Statistics**											
712	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
713												
714	**Nonparametric Distribution Free UCLs**											
715					95% CLT UCL	152.6	95% Jackknife UCL					153.5
716					95% Standard Bootstrap UCL	152.8	95% Bootstrap-t UCL					158.9
717					95% Hall's Bootstrap UCL	167.3	95% Percentile Bootstrap UCL					153.7
718					95% BCA Bootstrap UCL	159						
719					90% Chebyshev(Mean, Sd) UCL	172.9	95% Chebyshev(Mean, Sd) UCL					193.2
720					97.5% Chebyshev(Mean, Sd) UCL	221.5	99% Chebyshev(Mean, Sd) UCL					277
721												
722	**Suggested UCL to Use**											
723					95% Adjusted Gamma UCL	159.4						
724												
725	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
726	Recommendations are based upon data size, data distribution, and skewness.											
727	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
728	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											

	A	B	C	D	E	F	G	H	I	J	K	L
729												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3	User Selected Options											
4	Date/Time of Computation	ProUCL 5.111/27/2017 6:41:23 PM										
5	From File	SED467-Paradise Creek River Sed_Formatted_Data_b.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	**Val_BISMUTH_212**											
12												
13	**General Statistics**											
14	Total Number of Observations			24			Number of Distinct Observations				23	
15							Number of Missing Observations				0	
16	Minimum			0.439			Mean				1.07	
17	Maximum			1.58			Median				1.115	
18	SD			0.296			Std. Error of Mean				0.0603	
19	Coefficient of Variation			0.276			Skewness				-0.328	
20												
21	**Normal GOF Test**											
22	Shapiro Wilk Test Statistic			0.977			**Shapiro Wilk GOF Test**					
23	5% Shapiro Wilk Critical Value			0.916			Data appear Normal at 5% Significance Level					
24	Lilliefors Test Statistic			0.0999			**Lilliefors GOF Test**					
25	5% Lilliefors Critical Value			0.177			Data appear Normal at 5% Significance Level					
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
30	95% Student's-t UCL			1.173			95% Adjusted-CLT UCL (Chen-1995)				1.165	
31							95% Modified-t UCL (Johnson-1978)				1.173	
32												
33	**Gamma GOF Test**											
34	A-D Test Statistic			0.465			**Anderson-Darling Gamma GOF Test**					
35	5% A-D Critical Value			0.744			Detected data appear Gamma Distributed at 5% Significance Level					
36	K-S Test Statistic			0.14			**Kolmogorov-Smirnov Gamma GOF Test**					
37	5% K-S Critical Value			0.178			Detected data appear Gamma Distributed at 5% Significance Level					
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41	k hat (MLE)			11.62			k star (bias corrected MLE)				10.2	
42	Theta hat (MLE)			0.0921			Theta star (bias corrected MLE)				0.105	
43	nu hat (MLE)			557.8			nu star (bias corrected)				489.4	
44	MLE Mean (bias corrected)			1.07			MLE Sd (bias corrected)				0.335	
45							Approximate Chi Square Value (0.05)				439.1	
46	Adjusted Level of Significance			0.0392			Adjusted Chi Square Value				435.8	
47												
48	**Assuming Gamma Distribution**											
49	95% Approximate Gamma UCL (use when n>=50))			1.193			95% Adjusted Gamma UCL (use when n<50)				1.202	
50												
51	**Lognormal GOF Test**											
52	Shapiro Wilk Test Statistic			0.915			**Shapiro Wilk Lognormal GOF Test**					

53	5% Shapiro Wilk Critical Value					0.916	Data Not Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.164	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.177	Data appear Lognormal at 5% Significance Level					
56	**Data appear Approximate Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					-0.823	Mean of logged Data					0.024
60	Maximum of Logged Data					0.457	SD of logged Data					0.318
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					1.218	90% Chebyshev (MVUE) UCL					1.288
64	95% Chebyshev (MVUE) UCL					1.385	97.5% Chebyshev (MVUE) UCL					1.519
65	99% Chebyshev (MVUE) UCL					1.782						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					1.169	95% Jackknife UCL					1.173
72	95% Standard Bootstrap UCL					1.169	95% Bootstrap-t UCL					1.167
73	95% Hall's Bootstrap UCL					1.172	95% Percentile Bootstrap UCL					1.164
74	95% BCA Bootstrap UCL					1.159						
75	90% Chebyshev(Mean, Sd) UCL					1.251	95% Chebyshev(Mean, Sd) UCL					1.333
76	97.5% Chebyshev(Mean, Sd) UCL					1.447	99% Chebyshev(Mean, Sd) UCL					1.67
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					1.173						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
87	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
88												
89												
90	**Val_BISMUTH_214**											
91												
92	**General Statistics**											
93	Total Number of Observations					24	Number of Distinct Observations					23
94							Number of Missing Observations					0
95	Minimum					0.295	Mean					0.641
96	Maximum					0.908	Median					0.67
97	SD					0.169	Std. Error of Mean					0.0345
98	Coefficient of Variation					0.264	Skewness					-0.53
99												
100	**Normal GOF Test**											
101	Shapiro Wilk Test Statistic					0.94	**Shapiro Wilk GOF Test**					
102	5% Shapiro Wilk Critical Value					0.916	Data appear Normal at 5% Significance Level					
103	Lilliefors Test Statistic					0.175	**Lilliefors GOF Test**					
104	5% Lilliefors Critical Value					0.177	Data appear Normal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
105	**Data appear Normal at 5% Significance Level**											
106												
107	**Assuming Normal Distribution**											
108	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
109	95% Student's-t UCL					0.701	95% Adjusted-CLT UCL (Chen-1995)					0.694
110							95% Modified-t UCL (Johnson-1978)					0.7
111												
112	**Gamma GOF Test**											
113	A-D Test Statistic					0.903	**Anderson-Darling Gamma GOF Test**					
114	5% A-D Critical Value					0.744	Data Not Gamma Distributed at 5% Significance Level					
115	K-S Test Statistic					0.192	**Kolmogorov-Smirnov Gamma GOF Test**					
116	5% K-S Critical Value					0.178	Data Not Gamma Distributed at 5% Significance Level					
117	**Data Not Gamma Distributed at 5% Significance Level**											
118												
119	**Gamma Statistics**											
120	k hat (MLE)					12.66	k star (bias corrected MLE)					11.11
121	Theta hat (MLE)					0.0506	Theta star (bias corrected MLE)					0.0577
122	nu hat (MLE)					607.9	nu star (bias corrected)					533.2
123	MLE Mean (bias corrected)					0.641	MLE Sd (bias corrected)					0.192
124							Approximate Chi Square Value (0.05)					480.7
125	Adjusted Level of Significance					0.0392	Adjusted Chi Square Value					477.2
126												
127	**Assuming Gamma Distribution**											
128	95% Approximate Gamma UCL (use when n>=50))					0.711	95% Adjusted Gamma UCL (use when n<50)					0.717
129												
130	**Lognormal GOF Test**											
131	Shapiro Wilk Test Statistic					0.886	**Shapiro Wilk Lognormal GOF Test**					
132	5% Shapiro Wilk Critical Value					0.916	Data Not Lognormal at 5% Significance Level					
133	Lilliefors Test Statistic					0.193	**Lilliefors Lognormal GOF Test**					
134	5% Lilliefors Critical Value					0.177	Data Not Lognormal at 5% Significance Level					
135	**Data Not Lognormal at 5% Significance Level**											
136												
137	**Lognormal Statistics**											
138	Minimum of Logged Data					-1.221	Mean of logged Data					-0.484
139	Maximum of Logged Data					-0.0965	SD of logged Data					0.304
140												
141	**Assuming Lognormal Distribution**											
142	95% H-UCL					0.725	90% Chebyshev (MVUE) UCL					0.766
143	95% Chebyshev (MVUE) UCL					0.821	97.5% Chebyshev (MVUE) UCL					0.897
144	99% Chebyshev (MVUE) UCL					1.048						
145												
146	**Nonparametric Distribution Free UCL Statistics**											
147	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
148												
149	**Nonparametric Distribution Free UCLs**											
150	95% CLT UCL					0.698	95% Jackknife UCL					0.701
151	95% Standard Bootstrap UCL					0.698	95% Bootstrap-t UCL					0.696
152	95% Hall's Bootstrap UCL					0.693	95% Percentile Bootstrap UCL					0.695
153	95% BCA Bootstrap UCL					0.694						
154	90% Chebyshev(Mean, Sd) UCL					0.745	95% Chebyshev(Mean, Sd) UCL					0.792
155	97.5% Chebyshev(Mean, Sd) UCL					0.857	99% Chebyshev(Mean, Sd) UCL					0.985
156												

157	**Suggested UCL to Use**											
158				95% Student's-t UCL		0.701						
159												
160	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
161	Recommendations are based upon data size, data distribution, and skewness.											
162	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
163	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
164												
165	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
166	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
167												
168												
169	**Val_CESIUM_137**											
170												
171	**General Statistics**											
172				Total Number of Observations		22			Number of Distinct Observations			22
173									Number of Missing Observations			0
174				Minimum		0.0154			Mean			0.138
175				Maximum		0.467			Median			0.124
176				SD		0.112			Std. Error of Mean			0.0238
177				Coefficient of Variation		0.811			Skewness			1.828
178												
179	**Normal GOF Test**											
180				Shapiro Wilk Test Statistic		0.805			**Shapiro Wilk GOF Test**			
181				5% Shapiro Wilk Critical Value		0.911			Data Not Normal at 5% Significance Level			
182				Lilliefors Test Statistic		0.211			**Lilliefors GOF Test**			
183				5% Lilliefors Critical Value		0.184			Data Not Normal at 5% Significance Level			
184	**Data Not Normal at 5% Significance Level**											
185												
186	**Assuming Normal Distribution**											
187				**95% Normal UCL**					**95% UCLs (Adjusted for Skewness)**			
188				95% Student's-t UCL		0.179			95% Adjusted-CLT UCL (Chen-1995)			0.187
189									95% Modified-t UCL (Johnson-1978)			0.18
190												
191	**Gamma GOF Test**											
192				A-D Test Statistic		0.38			**Anderson-Darling Gamma GOF Test**			
193				5% A-D Critical Value		0.757			Detected data appear Gamma Distributed at 5% Significance Level			
194				K-S Test Statistic		0.114			**Kolmogorov-Smirnov Gamma GOF Test**			
195				5% K-S Critical Value		0.188			Detected data appear Gamma Distributed at 5% Significance Level			
196	**Detected data appear Gamma Distributed at 5% Significance Level**											
197												
198	**Gamma Statistics**											
199				k hat (MLE)		1.84			k star (bias corrected MLE)			1.62
200				Theta hat (MLE)		0.0748			Theta star (bias corrected MLE)			0.085
201				nu hat (MLE)		80.98			nu star (bias corrected)			71.27
202				MLE Mean (bias corrected)		0.138			MLE Sd (bias corrected)			0.108
203									Approximate Chi Square Value (0.05)			52.83
204				Adjusted Level of Significance		0.0386			Adjusted Chi Square Value			51.65
205												
206	**Assuming Gamma Distribution**											
207				95% Approximate Gamma UCL (use when n>=50)		0.186			95% Adjusted Gamma UCL (use when n<50)			0.19
208												

209	**Lognormal GOF Test**											
210					Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**					
211					5% Shapiro Wilk Critical Value	0.911	Data appear Lognormal at 5% Significance Level					
212					Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**					
213					5% Lilliefors Critical Value	0.184	Data appear Lognormal at 5% Significance Level					
214	**Data appear Lognormal at 5% Significance Level**											
215												
216	**Lognormal Statistics**											
217					Minimum of Logged Data	-4.173				Mean of logged Data	-2.278	
218					Maximum of Logged Data	-0.761				SD of logged Data	0.83	
219												
220	**Assuming Lognormal Distribution**											
221					95% H-UCL	0.222				90% Chebyshev (MVUE) UCL	0.224	
222					95% Chebyshev (MVUE) UCL	0.261				97.5% Chebyshev (MVUE) UCL	0.313	
223					99% Chebyshev (MVUE) UCL	0.415						
224												
225	**Nonparametric Distribution Free UCL Statistics**											
226	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
227												
228	**Nonparametric Distribution Free UCLs**											
229					95% CLT UCL	0.177				95% Jackknife UCL	0.179	
230					95% Standard Bootstrap UCL	0.177				95% Bootstrap-t UCL	0.205	
231					95% Hall's Bootstrap UCL	0.261				95% Percentile Bootstrap UCL	0.177	
232					95% BCA Bootstrap UCL	0.189						
233					90% Chebyshev(Mean, Sd) UCL	0.209				95% Chebyshev(Mean, Sd) UCL	0.242	
234					97.5% Chebyshev(Mean, Sd) UCL	0.286				99% Chebyshev(Mean, Sd) UCL	0.375	
235												
236	**Suggested UCL to Use**											
237					95% Adjusted Gamma UCL	0.19						
238												
239	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
240	Recommendations are based upon data size, data distribution, and skewness.											
241	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
242	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
243												
244												
245	**Val_LEAD_212**											
246												
247	**General Statistics**											
248					Total Number of Observations	24				Number of Distinct Observations	24	
249										Number of Missing Observations	0	
250					Minimum	0.375				Mean	0.867	
251					Maximum	1.23				Median	0.931	
252					SD	0.247				Std. Error of Mean	0.0505	
253					Coefficient of Variation	0.285				Skewness	-0.472	
254												
255	**Normal GOF Test**											
256					Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**					
257					5% Shapiro Wilk Critical Value	0.916	Data appear Normal at 5% Significance Level					
258					Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**					
259					5% Lilliefors Critical Value	0.177	Data appear Normal at 5% Significance Level					
260	**Data appear Normal at 5% Significance Level**											

261												
262	**Assuming Normal Distribution**											
263	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
264					95% Student's-t UCL	0.954				95% Adjusted-CLT UCL (Chen-1995)		0.945
265										95% Modified-t UCL (Johnson-1978)		0.953
266												
267	**Gamma GOF Test**											
268					A-D Test Statistic	0.637	**Anderson-Darling Gamma GOF Test**					
269					5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level					
270					K-S Test Statistic	0.162	**Kolmogorov-Smirnov Gamma GOF Test**					
271					5% K-S Critical Value	0.178	Detected data appear Gamma Distributed at 5% Significance Level					
272	**Detected data appear Gamma Distributed at 5% Significance Level**											
273												
274	**Gamma Statistics**											
275					k hat (MLE)	10.71				k star (bias corrected MLE)		9.398
276					Theta hat (MLE)	0.081				Theta star (bias corrected MLE)		0.0923
277					nu hat (MLE)	514				nu star (bias corrected)		451.1
278					MLE Mean (bias corrected)	0.867				MLE Sd (bias corrected)		0.283
279										Approximate Chi Square Value (0.05)		402.9
280					Adjusted Level of Significance	0.0392				Adjusted Chi Square Value		399.7
281												
282	**Assuming Gamma Distribution**											
283	95% Approximate Gamma UCL (use when n>=50))					0.971				95% Adjusted Gamma UCL (use when n<50)		0.979
284												
285	**Lognormal GOF Test**											
286					Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk Lognormal GOF Test**					
287					5% Shapiro Wilk Critical Value	0.916	Data Not Lognormal at 5% Significance Level					
288					Lilliefors Test Statistic	0.171	**Lilliefors Lognormal GOF Test**					
289					5% Lilliefors Critical Value	0.177	Data appear Lognormal at 5% Significance Level					
290	**Data appear Approximate Lognormal at 5% Significance Level**											
291												
292	**Lognormal Statistics**											
293					Minimum of Logged Data	-0.981				Mean of logged Data		-0.19
294					Maximum of Logged Data	0.207				SD of logged Data		0.333
295												
296	**Assuming Lognormal Distribution**											
297					95% H-UCL	0.994				90% Chebyshev (MVUE) UCL		1.053
298					95% Chebyshev (MVUE) UCL	1.135				97.5% Chebyshev (MVUE) UCL		1.249
299					99% Chebyshev (MVUE) UCL	1.473						
300												
301	**Nonparametric Distribution Free UCL Statistics**											
302	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
303												
304	**Nonparametric Distribution Free UCLs**											
305					95% CLT UCL	0.95				95% Jackknife UCL		0.954
306					95% Standard Bootstrap UCL	0.947				95% Bootstrap-t UCL		0.945
307					95% Hall's Bootstrap UCL	0.946				95% Percentile Bootstrap UCL		0.948
308					95% BCA Bootstrap UCL	0.946						
309					90% Chebyshev(Mean, Sd) UCL	1.019				95% Chebyshev(Mean, Sd) UCL		1.087
310					97.5% Chebyshev(Mean, Sd) UCL	1.183				99% Chebyshev(Mean, Sd) UCL		1.37
311												
312	**Suggested UCL to Use**											

313					95% Student's-t UCL	0.954						
314												
315	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
316	Recommendations are based upon data size, data distribution, and skewness.											
317	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
318	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
319												
320	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
321	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
322												
323												
324	**Val_LEAD_214**											
325												
326	**General Statistics**											
327					Total Number of Observations	24			Number of Distinct Observations	23		
328									Number of Missing Observations	0		
329					Minimum	0.342			Mean	0.743		
330					Maximum	1.045			Median	0.798		
331					SD	0.193			Std. Error of Mean	0.0394		
332					Coefficient of Variation	0.26			Skewness	-0.778		
333												
334	**Normal GOF Test**											
335					Shapiro Wilk Test Statistic	0.915			**Shapiro Wilk GOF Test**			
336					5% Shapiro Wilk Critical Value	0.916			Data Not Normal at 5% Significance Level			
337					Lilliefors Test Statistic	0.164			**Lilliefors GOF Test**			
338					5% Lilliefors Critical Value	0.177			Data appear Normal at 5% Significance Level			
339	**Data appear Approximate Normal at 5% Significance Level**											
340												
341	**Assuming Normal Distribution**											
342					**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**			
343					95% Student's-t UCL	0.811			95% Adjusted-CLT UCL (Chen-1995)	0.802		
344									95% Modified-t UCL (Johnson-1978)	0.81		
345												
346	**Gamma GOF Test**											
347					A-D Test Statistic	1.295			**Anderson-Darling Gamma GOF Test**			
348					5% A-D Critical Value	0.744			Data Not Gamma Distributed at 5% Significance Level			
349					K-S Test Statistic	0.196			**Kolmogorov-Smirnov Gamma GOF Test**			
350					5% K-S Critical Value	0.178			Data Not Gamma Distributed at 5% Significance Level			
351	**Data Not Gamma Distributed at 5% Significance Level**											
352												
353	**Gamma Statistics**											
354					k hat (MLE)	12.49			k star (bias corrected MLE)	10.96		
355					Theta hat (MLE)	0.0595			Theta star (bias corrected MLE)	0.0678		
356					nu hat (MLE)	599.6			nu star (bias corrected)	526		
357					MLE Mean (bias corrected)	0.743			MLE Sd (bias corrected)	0.225		
358									Approximate Chi Square Value (0.05)	473.8		
359					Adjusted Level of Significance	0.0392			Adjusted Chi Square Value	470.3		
360												
361	**Assuming Gamma Distribution**											
362					95% Approximate Gamma UCL (use when n>=50))	0.825			95% Adjusted Gamma UCL (use when n<50)	0.831		
363												
364	**Lognormal GOF Test**											

365					Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk Lognormal GOF Test**					
366					5% Shapiro Wilk Critical Value	0.916	Data Not Lognormal at 5% Significance Level					
367					Lilliefors Test Statistic	0.217	**Lilliefors Lognormal GOF Test**					
368					5% Lilliefors Critical Value	0.177	Data Not Lognormal at 5% Significance Level					
369	**Data Not Lognormal at 5% Significance Level**											
370												
371	**Lognormal Statistics**											
372					Minimum of Logged Data	-1.073				Mean of logged Data	-0.337	
373					Maximum of Logged Data	0.0435				SD of logged Data	0.309	
374												
375	**Assuming Lognormal Distribution**											
376					95% H-UCL	0.843				90% Chebyshev (MVUE) UCL	0.891	
377					95% Chebyshev (MVUE) UCL	0.956				97.5% Chebyshev (MVUE) UCL	1.047	
378					99% Chebyshev (MVUE) UCL	1.225						
379												
380	**Nonparametric Distribution Free UCL Statistics**											
381	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
382												
383	**Nonparametric Distribution Free UCLs**											
384					95% CLT UCL	0.808				95% Jackknife UCL	0.811	
385					95% Standard Bootstrap UCL	0.807				95% Bootstrap-t UCL	0.805	
386					95% Hall's Bootstrap UCL	0.804				95% Percentile Bootstrap UCL	0.803	
387					95% BCA Bootstrap UCL	0.801						
388					90% Chebyshev(Mean, Sd) UCL	0.862				95% Chebyshev(Mean, Sd) UCL	0.915	
389					97.5% Chebyshev(Mean, Sd) UCL	0.989				99% Chebyshev(Mean, Sd) UCL	1.135	
390												
391	**Suggested UCL to Use**											
392					95% Student's-t UCL	0.811						
393												
394	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
395	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
396												
397	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
398	Recommendations are based upon data size, data distribution, and skewness.											
399	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
400	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
401												
402	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
403	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
404												
405												
406	**Val_POTASSIUM_40**											
407												
408	**General Statistics**											
409					Total Number of Observations	24				Number of Distinct Observations	23	
410										Number of Missing Observations	0	
411					Minimum	6.43				Mean	13.51	
412					Maximum	18.8				Median	14.3	
413					SD	3.405				Std. Error of Mean	0.695	
414					Coefficient of Variation	0.252				Skewness	-0.635	
415												
416	**Normal GOF Test**											

417					Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**					
418					5% Shapiro Wilk Critical Value	0.916	Data appear Normal at 5% Significance Level					
419					Lilliefors Test Statistic	0.152	**Lilliefors GOF Test**					
420					5% Lilliefors Critical Value	0.177	Data appear Normal at 5% Significance Level					
421	**Data appear Normal at 5% Significance Level**											
422												
423	**Assuming Normal Distribution**											
424	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
425					95% Student's-t UCL	14.7					95% Adjusted-CLT UCL (Chen-1995)	14.56
426											95% Modified-t UCL (Johnson-1978)	14.69
427												
428	**Gamma GOF Test**											
429					A-D Test Statistic	0.822	**Anderson-Darling Gamma GOF Test**					
430					5% A-D Critical Value	0.744	Data Not Gamma Distributed at 5% Significance Level					
431					K-S Test Statistic	0.182	**Kolmogorov-Smirnov Gamma GOF Test**					
432					5% K-S Critical Value	0.178	Data Not Gamma Distributed at 5% Significance Level					
433	**Data Not Gamma Distributed at 5% Significance Level**											
434												
435	**Gamma Statistics**											
436					k hat (MLE)	13.76					k star (bias corrected MLE)	12.07
437					Theta hat (MLE)	0.982					Theta star (bias corrected MLE)	1.119
438					nu hat (MLE)	660.5					nu star (bias corrected)	579.3
439					MLE Mean (bias corrected)	13.51					MLE Sd (bias corrected)	3.889
440											Approximate Chi Square Value (0.05)	524.4
441					Adjusted Level of Significance	0.0392					Adjusted Chi Square Value	520.8
442												
443	**Assuming Gamma Distribution**											
444					95% Approximate Gamma UCL (use when n>=50))	14.92					95% Adjusted Gamma UCL (use when n<50)	15.03
445												
446	**Lognormal GOF Test**											
447					Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**					
448					5% Shapiro Wilk Critical Value	0.916	Data Not Lognormal at 5% Significance Level					
449					Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**					
450					5% Lilliefors Critical Value	0.177	Data Not Lognormal at 5% Significance Level					
451	**Data Not Lognormal at 5% Significance Level**											
452												
453	**Lognormal Statistics**											
454					Minimum of Logged Data	1.861					Mean of logged Data	2.567
455					Maximum of Logged Data	2.934					SD of logged Data	0.292
456												
457	**Assuming Lognormal Distribution**											
458					95% H-UCL	15.18					90% Chebyshev (MVUE) UCL	16.02
459					95% Chebyshev (MVUE) UCL	17.14					97.5% Chebyshev (MVUE) UCL	18.68
460					99% Chebyshev (MVUE) UCL	21.72						
461												
462	**Nonparametric Distribution Free UCL Statistics**											
463	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
464												
465	**Nonparametric Distribution Free UCLs**											
466					95% CLT UCL	14.65					95% Jackknife UCL	14.7
467					95% Standard Bootstrap UCL	14.61					95% Bootstrap-t UCL	14.6
468					95% Hall's Bootstrap UCL	14.56					95% Percentile Bootstrap UCL	14.6

469					95% BCA Bootstrap UCL	14.58						
470					90% Chebyshev(Mean, Sd) UCL	15.59					95% Chebyshev(Mean, Sd) UCL	16.54
471					97.5% Chebyshev(Mean, Sd) UCL	17.85					99% Chebyshev(Mean, Sd) UCL	20.43
472												
473					**Suggested UCL to Use**							
474					95% Student's-t UCL	14.7						
475												
476	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
477	Recommendations are based upon data size, data distribution, and skewness.											
478	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
479	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
480												
481	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
482	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
483												
484												
485	**Val_RADIUM_228**											
486												
487					**General Statistics**							
488					Total Number of Observations	24					Number of Distinct Observations	24
489											Number of Missing Observations	0
490					Minimum	0.394					Mean	0.949
491					Maximum	1.38					Median	0.97
492					SD	0.274					Std. Error of Mean	0.0558
493					Coefficient of Variation	0.288					Skewness	-0.433
494												
495					**Normal GOF Test**							
496					Shapiro Wilk Test Statistic	0.962					**Shapiro Wilk GOF Test**	
497					5% Shapiro Wilk Critical Value	0.916					Data appear Normal at 5% Significance Level	
498					Lilliefors Test Statistic	0.114					**Lilliefors GOF Test**	
499					5% Lilliefors Critical Value	0.177					Data appear Normal at 5% Significance Level	
500					**Data appear Normal at 5% Significance Level**							
501												
502					**Assuming Normal Distribution**							
503					**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**	
504					95% Student's-t UCL	1.045					95% Adjusted-CLT UCL (Chen-1995)	1.035
505											95% Modified-t UCL (Johnson-1978)	1.044
506												
507					**Gamma GOF Test**							
508					A-D Test Statistic	0.531					**Anderson-Darling Gamma GOF Test**	
509					5% A-D Critical Value	0.744					Detected data appear Gamma Distributed at 5% Significance Level	
510					K-S Test Statistic	0.13					**Kolmogorov-Smirnov Gamma GOF Test**	
511					5% K-S Critical Value	0.178					Detected data appear Gamma Distributed at 5% Significance Level	
512					**Detected data appear Gamma Distributed at 5% Significance Level**							
513												
514					**Gamma Statistics**							
515					k hat (MLE)	10.52					k star (bias corrected MLE)	9.229
516					Theta hat (MLE)	0.0902					Theta star (bias corrected MLE)	0.103
517					nu hat (MLE)	504.7					nu star (bias corrected)	443
518					MLE Mean (bias corrected)	0.949					MLE Sd (bias corrected)	0.312
519											Approximate Chi Square Value (0.05)	395.2
520					Adjusted Level of Significance	0.0392					Adjusted Chi Square Value	392

521												
522	**Assuming Gamma Distribution**											
523	95% Approximate Gamma UCL (use when n>=50))					1.064	95% Adjusted Gamma UCL (use when n<50)					1.072
524												
525	**Lognormal GOF Test**											
526	Shapiro Wilk Test Statistic					0.904	**Shapiro Wilk Lognormal GOF Test**					
527	5% Shapiro Wilk Critical Value					0.916	Data Not Lognormal at 5% Significance Level					
528	Lilliefors Test Statistic					0.13	**Lilliefors Lognormal GOF Test**					
529	5% Lilliefors Critical Value					0.177	Data appear Lognormal at 5% Significance Level					
530	**Data appear Approximate Lognormal at 5% Significance Level**											
531												
532	**Lognormal Statistics**											
533	Minimum of Logged Data					-0.931	Mean of logged Data					-0.101
534	Maximum of Logged Data					0.322	SD of logged Data					0.336
535												
536	**Assuming Lognormal Distribution**											
537	95% H-UCL					1.089	90% Chebyshev (MVUE) UCL					1.154
538	95% Chebyshev (MVUE) UCL					1.245	97.5% Chebyshev (MVUE) UCL					1.37
539	99% Chebyshev (MVUE) UCL					1.617						
540												
541	**Nonparametric Distribution Free UCL Statistics**											
542	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
543												
544	**Nonparametric Distribution Free UCLs**											
545	95% CLT UCL					1.041	95% Jackknife UCL					1.045
546	95% Standard Bootstrap UCL					1.039	95% Bootstrap-t UCL					1.04
547	95% Hall's Bootstrap UCL					1.033	95% Percentile Bootstrap UCL					1.042
548	95% BCA Bootstrap UCL					1.034						
549	90% Chebyshev(Mean, Sd) UCL					1.116	95% Chebyshev(Mean, Sd) UCL					1.192
550	97.5% Chebyshev(Mean, Sd) UCL					1.298	99% Chebyshev(Mean, Sd) UCL					1.504
551												
552	**Suggested UCL to Use**											
553	95% Student's-t UCL					1.045						
554												
555	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
556	Recommendations are based upon data size, data distribution, and skewness.											
557	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
558	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
559												
560	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
561	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
562												
563												
564	**Val_THALLIUM_208**											
565												
566	**General Statistics**											
567	Total Number of Observations					24	Number of Distinct Observations					24
568							Number of Missing Observations					0
569	Minimum					0.118	Mean					0.288
570	Maximum					0.414	Median					0.29
571	SD					0.0834	Std. Error of Mean					0.017
572	Coefficient of Variation					0.29	Skewness					-0.386

573												
574	**Normal GOF Test**											
575					Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk GOF Test**					
576					5% Shapiro Wilk Critical Value	0.916	Data appear Normal at 5% Significance Level					
577					Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**					
578					5% Lilliefors Critical Value	0.177	Data appear Normal at 5% Significance Level					
579	**Data appear Normal at 5% Significance Level**											
580												
581	**Assuming Normal Distribution**											
582	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
583					95% Student's-t UCL	0.317	95% Adjusted-CLT UCL (Chen-1995)					0.314
584							95% Modified-t UCL (Johnson-1978)					0.317
585												
586	**Gamma GOF Test**											
587					A-D Test Statistic	0.524	**Anderson-Darling Gamma GOF Test**					
588					5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level					
589					K-S Test Statistic	0.127	**Kolmogorov-Smirnov Gamma GOF Test**					
590					5% K-S Critical Value	0.178	Detected data appear Gamma Distributed at 5% Significance Level					
591	**Detected data appear Gamma Distributed at 5% Significance Level**											
592												
593	**Gamma Statistics**											
594					k hat (MLE)	10.54	k star (bias corrected MLE)					9.248
595					Theta hat (MLE)	0.0273	Theta star (bias corrected MLE)					0.0311
596					nu hat (MLE)	505.8	nu star (bias corrected)					443.9
597					MLE Mean (bias corrected)	0.288	MLE Sd (bias corrected)					0.0947
598							Approximate Chi Square Value (0.05)					396.1
599					Adjusted Level of Significance	0.0392	Adjusted Chi Square Value					392.9
600												
601	**Assuming Gamma Distribution**											
602					95% Approximate Gamma UCL (use when n>=50))	0.323	95% Adjusted Gamma UCL (use when n<50)					0.325
603												
604	**Lognormal GOF Test**											
605					Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk Lognormal GOF Test**					
606					5% Shapiro Wilk Critical Value	0.916	Data Not Lognormal at 5% Significance Level					
607					Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**					
608					5% Lilliefors Critical Value	0.177	Data appear Lognormal at 5% Significance Level					
609	**Data appear Approximate Lognormal at 5% Significance Level**											
610												
611	**Lognormal Statistics**											
612					Minimum of Logged Data	-2.137	Mean of logged Data					-1.293
613					Maximum of Logged Data	-0.882	SD of logged Data					0.334
614												
615	**Assuming Lognormal Distribution**											
616					95% H-UCL	0.33	90% Chebyshev (MVUE) UCL					0.35
617					95% Chebyshev (MVUE) UCL	0.377	97.5% Chebyshev (MVUE) UCL					0.415
618					99% Chebyshev (MVUE) UCL	0.49						
619												
620	**Nonparametric Distribution Free UCL Statistics**											
621	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
622												
623	**Nonparametric Distribution Free UCLs**											
624					95% CLT UCL	0.316	95% Jackknife UCL					0.317

	A	B	C	D	E	F	G	H	I	J	K	L
625				95% Standard Bootstrap UCL		0.315				95% Bootstrap-t UCL		0.316
626				95% Hall's Bootstrap UCL		0.314				95% Percentile Bootstrap UCL		0.316
627				95% BCA Bootstrap UCL		0.314						
628				90% Chebyshev(Mean, Sd) UCL		0.339				95% Chebyshev(Mean, Sd) UCL		0.362
629				97.5% Chebyshev(Mean, Sd) UCL		0.394				99% Chebyshev(Mean, Sd) UCL		0.457
630												
631						**Suggested UCL to Use**						
632				95% Student's-t UCL		0.317						
633												
634						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
635						Recommendations are based upon data size, data distribution, and skewness.						
636						These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).						
637						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
638												
639						**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**						
640						**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**						
641												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/17/2017 10:46:10 AM								
5			From File	SED467-Paradise Creek River Sed_TEQ_Cong_Formatted_Data.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_TCDD_TEQ**											
12												
13	**General Statistics**											
14						Total Number of Observations	16			Number of Distinct Observations	16		
15										Number of Missing Observations	0	
16						Minimum	6.0732E-7			Mean	1.7258E-5	
17						Maximum	5.41E-05			Median	1.3765E-5	
18						SD	1.5089E-5			Std. Error of Mean	3.7723E-6	
19						Coefficient of Variation	N/A			Skewness	1.104	
20												
21	**Normal GOF Test**											
22						Shapiro Wilk Test Statistic	0.901			**Shapiro Wilk GOF Test**		
23						5% Shapiro Wilk Critical Value	0.887			Data appear Normal at 5% Significance Level		
24						Lilliefors Test Statistic	0.153			**Lilliefors GOF Test**		
25						5% Lilliefors Critical Value	0.213			Data appear Normal at 5% Significance Level		
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29						**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**		
30						95% Student's-t UCL	2.3871E-5			95% Adjusted-CLT UCL (Chen-1995)	2.4576E-5	
31										95% Modified-t UCL (Johnson-1978)	2.4045E-5	
32												
33	**Gamma GOF Test**											
34						A-D Test Statistic	0.216			**Anderson-Darling Gamma GOF Test**		
35						5% A-D Critical Value	0.761			Detected data appear Gamma Distributed at 5% Significance Level		
36						K-S Test Statistic	0.148			**Kolmogorov-Smirnov Gamma GOF Test**		
37						5% K-S Critical Value	0.221			Detected data appear Gamma Distributed at 5% Significance Level		
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41						k hat (MLE)	1.11			k star (bias corrected MLE)	0.944	
42						Theta hat (MLE)	1.5541E-5			Theta star (bias corrected MLE)	1.8283E-5	
43						nu hat (MLE)	35.54			nu star (bias corrected)	30.21	
44						MLE Mean (bias corrected)	1.7258E-5			MLE Sd (bias corrected)	1.7763E-5	
45										Approximate Chi Square Value (0.05)	18.65	
46						Adjusted Level of Significance	0.0335			Adjusted Chi Square Value	17.63	
47												
48	**Assuming Gamma Distribution**											
49						95% Approximate Gamma UCL (use when n>=50))	2.7944E-5			95% Adjusted Gamma UCL (use when n<50)	2.9576E-5	
50												
51	**Lognormal GOF Test**											
52						Shapiro Wilk Test Statistic	0.931			**Shapiro Wilk Lognormal GOF Test**		

	A	B	C	D	E	F	G	H	I	J	K	L
53	5% Shapiro Wilk Critical Value					0.887	Data appear Lognormal at 5% Significance Level					
54	Lilliefors Test Statistic					0.205	**Lilliefors Lognormal GOF Test**					
55	5% Lilliefors Critical Value					0.213	Data appear Lognormal at 5% Significance Level					
56	**Data appear Lognormal at 5% Significance Level**											
57												
58	**Lognormal Statistics**											
59	Minimum of Logged Data					-14.31	Mean of logged Data					-11.48
60	Maximum of Logged Data					-9.825	SD of logged Data					1.233
61												
62	**Assuming Lognormal Distribution**											
63	95% H-UCL					5.8862E-5	90% Chebyshev (MVUE) UCL					4.1871E-5
64	95% Chebyshev (MVUE) UCL					5.1556E-5	97.5% Chebyshev (MVUE) UCL					6.4998E-5
65	99% Chebyshev (MVUE) UCL					9.1401E-5						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					2.3463E-5	95% Jackknife UCL					2.3871E-5
72	95% Standard Bootstrap UCL					2.3211E-5	95% Bootstrap-t UCL					2.5264E-5
73	95% Hall's Bootstrap UCL					2.6366E-5	95% Percentile Bootstrap UCL					2.3303E-5
74	95% BCA Bootstrap UCL					2.4430E-5						
75	90% Chebyshev(Mean, Sd) UCL					2.8575E-5	95% Chebyshev(Mean, Sd) UCL					3.3701E-5
76	97.5% Chebyshev(Mean, Sd) UCL					4.0816E-5	99% Chebyshev(Mean, Sd) UCL					5.4792E-5
77												
78	**Suggested UCL to Use**											
79	95% Student's-t UCL					2.39E-05						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	Recommendations are based upon data size, data distribution, and skewness.											
83	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
84	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
85												
86												

Paradise Creek Surface Water

UCL Statistics for Data Sets with Non-Detects		
User Selected Options		
Date/Time of Computation	ProUCL 5.111/15/2017 11:44:29 AM	
From File	SW455-Paradise Creek River SW_Formatted_Data.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	
Val_CHROMIUM		
General Statistics		
Total Number of Observations	12	Number of Distinct Observations 11
Number of Detects	11	Number of Non-Detects 1
Number of Distinct Detects	10	Number of Distinct Non-Detects 1
Minimum Detect	1.1	Minimum Non-Detect 10
Maximum Detect	3.85	Maximum Non-Detect 10
Variance Detects	0.797	Percent Non-Detects 8.333%
Mean Detects	2.105	SD Detects 0.893
Median Detects	1.7	CV Detects 0.424
Skewness Detects	0.906	Kurtosis Detects -0.0652
Mean of Logged Detects	0.667	SD of Logged Detects 0.408
Normal GOF Test on Detects Only		
Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.251	Detected Data appear Normal at 5% Significance Level
Detected Data appear Normal at 5% Significance Level		
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs		
KM Mean	2.105	KM Standard Error of Mean 0.269
KM SD	0.851	95% KM (BCA) UCL 2.545
95% KM (t) UCL	2.588	95% KM (Percentile Bootstrap) UCL 2.55
95% KM (z) UCL	2.547	95% KM Bootstrap t UCL 2.761
90% KM Chebyshev UCL	2.912	95% KM Chebyshev UCL 3.278
97.5% KM Chebyshev UCL	3.786	99% KM Chebyshev UCL 4.783
Gamma GOF Tests on Detected Observations Only		
A-D Test Statistic	0.284	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.256	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		
Gamma Statistics on Detected Data Only		
k hat (MLE)	6.645	k star (bias corrected MLE) 4.893
Theta hat (MLE)	0.317	Theta star (bias corrected MLE) 0.43
nu hat (MLE)	146.2	nu star (bias corrected) 107.6
Mean (detects)	2.105	
Gamma ROS Statistics using Imputed Non-Detects		

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	1.1				Mean		2.097
59					Maximum	3.85				Median		1.859
60					SD	0.852				CV		0.406
61					k hat (MLE)	7.228				k star (bias corrected MLE)		5.476
62					Theta hat (MLE)	0.29				Theta star (bias corrected MLE)		0.383
63					nu hat (MLE)	173.5				nu star (bias corrected)		131.4
64					Adjusted Level of Significance (β)	0.029						
65					Approximate Chi Square Value (131.43, α)	105.9				Adjusted Chi Square Value (131.43, β)		102.5
66					95% Gamma Approximate UCL (use when n>=50)	2.602				95% Gamma Adjusted UCL (use when n<50)		2.69
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	2.105				SD (KM)		0.851
70					Variance (KM)	0.725				SE of Mean (KM)		0.269
71					k hat (KM)	6.111				k star (KM)		4.639
72					nu hat (KM)	146.7				nu star (KM)		111.3
73					theta hat (KM)	0.344				theta star (KM)		0.454
74					80% gamma percentile (KM)	2.853				90% gamma percentile (KM)		3.413
75					95% gamma percentile (KM)	3.926				99% gamma percentile (KM)		5.013
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (111.34, α)	87.98				Adjusted Chi Square Value (111.34, β)		84.81
79					95% Gamma Approximate KM-UCL (use when n>=50)	2.663				95% Gamma Adjusted KM-UCL (use when n<50)		2.763
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.959				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.85				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.176				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.251				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	2.092				Mean in Log Scale		0.667
90					SD in Original Scale	0.853				SD in Log Scale		0.389
91					95% t UCL (assumes normality of ROS data)	2.533				95% Percentile Bootstrap UCL		2.508
92					95% BCA Bootstrap UCL	2.571				95% Bootstrap t UCL		2.686
93					95% H-UCL (Log ROS)	2.661						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	0.667				KM Geo Mean		1.948
97					KM SD (logged)	0.389				95% Critical H Value (KM-Log)		2.014
98					KM Standard Error of Mean (logged)	0.123				95% H-UCL (KM -Log)		2.661
99					KM SD (logged)	0.389				95% Critical H Value (KM-Log)		2.014
100					KM Standard Error of Mean (logged)	0.123						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	2.346				Mean in Log Scale		0.746

105					SD in Original Scale	1.193					SD in Log Scale	0.474
106					95% t UCL (Assumes normality)	2.964					95% H-Stat UCL	3.19
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM (t) UCL	2.588						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120												
121	**Val_IRON**											
122												
123	**General Statistics**											
124					Total Number of Observations	12					Number of Distinct Observations	12
125											Number of Missing Observations	0
126					Minimum	335					Mean	660.3
127					Maximum	963					Median	685
128					SD	203.2					Std. Error of Mean	58.67
129					Coefficient of Variation	0.308					Skewness	-0.187
130												
131	**Normal GOF Test**											
132					Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**					
133					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
134					Lilliefors Test Statistic	0.143	**Lilliefors GOF Test**					
135					5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level					
136	**Data appear Normal at 5% Significance Level**											
137												
138	**Assuming Normal Distribution**											
139	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
140					95% Student's-t UCL	765.6					95% Adjusted-CLT UCL (Chen-1995)	753.4
141											95% Modified-t UCL (Johnson-1978)	765.1
142												
143	**Gamma GOF Test**											
144					A-D Test Statistic	0.354	**Anderson-Darling Gamma GOF Test**					
145					5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level					
146					K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**					
147					5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level					
148	**Detected data appear Gamma Distributed at 5% Significance Level**											
149												
150	**Gamma Statistics**											
151					k hat (MLE)	10.27					k star (bias corrected MLE)	7.761
152					Theta hat (MLE)	64.27					Theta star (bias corrected MLE)	85.08
153					nu hat (MLE)	246.6					nu star (bias corrected)	186.3
154					MLE Mean (bias corrected)	660.3					MLE Sd (bias corrected)	237
155											Approximate Chi Square Value (0.05)	155.7
156					Adjusted Level of Significance	0.029					Adjusted Chi Square Value	151.4

157												
158	**Assuming Gamma Distribution**											
159	95% Approximate Gamma UCL (use when n>=50))					789.9	95% Adjusted Gamma UCL (use when n<50)					812.2
160												
161	**Lognormal GOF Test**											
162	Shapiro Wilk Test Statistic					0.924	**Shapiro Wilk Lognormal GOF Test**					
163	5% Shapiro Wilk Critical Value					0.859	Data appear Lognormal at 5% Significance Level					
164	Lilliefors Test Statistic					0.203	**Lilliefors Lognormal GOF Test**					
165	5% Lilliefors Critical Value					0.243	Data appear Lognormal at 5% Significance Level					
166	**Data appear Lognormal at 5% Significance Level**											
167												
168	**Lognormal Statistics**											
169	Minimum of Logged Data					5.814	Mean of logged Data					6.443
170	Maximum of Logged Data					6.87	SD of logged Data					0.341
171												
172	**Assuming Lognormal Distribution**											
173	95% H-UCL					814.9	90% Chebyshev (MVUE) UCL					860.4
174	95% Chebyshev (MVUE) UCL					950	97.5% Chebyshev (MVUE) UCL					1074
175	99% Chebyshev (MVUE) UCL					1319						
176												
177	**Nonparametric Distribution Free UCL Statistics**											
178	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
179												
180	**Nonparametric Distribution Free UCLs**											
181	95% CLT UCL					756.8	95% Jackknife UCL					765.6
182	95% Standard Bootstrap UCL					750.6	95% Bootstrap-t UCL					764.9
183	95% Hall's Bootstrap UCL					752.8	95% Percentile Bootstrap UCL					755.8
184	95% BCA Bootstrap UCL					752						
185	90% Chebyshev(Mean, Sd) UCL					836.3	95% Chebyshev(Mean, Sd) UCL					916
186	97.5% Chebyshev(Mean, Sd) UCL					1027	99% Chebyshev(Mean, Sd) UCL					1244
187												
188	**Suggested UCL to Use**											
189	95% Student's-t UCL					765.6						
190												
191	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
192	Recommendations are based upon data size, data distribution, and skewness.											
193	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
194	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
195												
196	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
197	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
198												
199	**Val_THALLIUM**											
200												
201	**General Statistics**											
202	Total Number of Observations					12	Number of Distinct Observations					8
203	Number of Detects					8	Number of Non-Detects					4
204	Number of Distinct Detects					7	Number of Distinct Non-Detects					1
205	Minimum Detect					2	Minimum Non-Detect					25
206	Maximum Detect					3.8	Maximum Non-Detect					25
207	Variance Detects					0.378	Percent Non-Detects					33.33%
208	Mean Detects					2.969	SD Detects					0.615

209					Median Detects	3.125					CV Detects	0.207
210					Skewness Detects	-0.507					Kurtosis Detects	-0.592
211					Mean of Logged Detects	1.068					SD of Logged Detects	0.222
212												
213					**Normal GOF Test on Detects Only**							
214					Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**					
215					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level					
216					Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**					
217					5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level					
218					**Detected Data appear Normal at 5% Significance Level**							
219												
220					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
221					KM Mean	2.969	KM Standard Error of Mean	0.217				
222					KM SD	0.575	95% KM (BCA) UCL	3.271				
223					95% KM (t) UCL	3.359	95% KM (Percentile Bootstrap) UCL	3.3				
224					95% KM (z) UCL	3.326	95% KM Bootstrap t UCL	3.343				
225					90% KM Chebyshev UCL	3.621	95% KM Chebyshev UCL	3.916				
226					97.5% KM Chebyshev UCL	4.326	99% KM Chebyshev UCL	5.131				
227												
228					**Gamma GOF Tests on Detected Observations Only**							
229					A-D Test Statistic	0.383	**Anderson-Darling GOF Test**					
230					5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level					
231					K-S Test Statistic	0.205	**Kolmogorov-Smirnov GOF**					
232					5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level					
233					**Detected data appear Gamma Distributed at 5% Significance Level**							
234												
235					**Gamma Statistics on Detected Data Only**							
236					k hat (MLE)	24.45	k star (bias corrected MLE)	15.37				
237					Theta hat (MLE)	0.121	Theta star (bias corrected MLE)	0.193				
238					nu hat (MLE)	391.2	nu star (bias corrected)	245.9				
239					Mean (detects)	2.969						
240												
241					**Gamma ROS Statistics using Imputed Non-Detects**							
242					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
243					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
244					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
245					This is especially true when the sample size is small.							
246					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
247					Minimum	2	Mean	2.966				
248					Maximum	3.8	Median	3.09				
249					SD	0.563	CV	0.19				
250					k hat (MLE)	28.34	k star (bias corrected MLE)	21.31				
251					Theta hat (MLE)	0.105	Theta star (bias corrected MLE)	0.139				
252					nu hat (MLE)	680.1	nu star (bias corrected)	511.4				
253					Adjusted Level of Significance (β)	0.029						
254					Approximate Chi Square Value (511.42, α)	460	Adjusted Chi Square Value (511.42, β)	452.5				
255					95% Gamma Approximate UCL (use when n>=50)	3.297	95% Gamma Adjusted UCL (use when n<50)	3.352				
256												
257					**Estimates of Gamma Parameters using KM Estimates**							
258					Mean (KM)	2.969	SD (KM)	0.575				
259					Variance (KM)	0.331	SE of Mean (KM)	0.217				
260					k hat (KM)	26.66	k star (KM)	20.05				

261					nu hat (KM)	639.8					nu star (KM)	481.2
262					theta hat (KM)	0.111					theta star (KM)	0.148
263					80% gamma percentile (KM)	3.508					90% gamma percentile (KM)	3.844
264					95% gamma percentile (KM)	4.137					99% gamma percentile (KM)	4.725
265												
266					**Gamma Kaplan-Meier (KM) Statistics**							
267					Approximate Chi Square Value (481.22, α)	431.3					Adjusted Chi Square Value (481.22, β)	424.1
268					95% Gamma Approximate KM-UCL (use when n>=50)	3.312					95% Gamma Adjusted KM-UCL (use when n<50)	3.368
269												
270					**Lognormal GOF Test on Detected Observations Only**							
271					Shapiro Wilk Test Statistic	0.911					**Shapiro Wilk GOF Test**	
272					5% Shapiro Wilk Critical Value	0.818					Detected Data appear Lognormal at 5% Significance Level	
273					Lilliefors Test Statistic	0.21					**Lilliefors GOF Test**	
274					5% Lilliefors Critical Value	0.283					Detected Data appear Lognormal at 5% Significance Level	
275					**Detected Data appear Lognormal at 5% Significance Level**							
276												
277					**Lognormal ROS Statistics Using Imputed Non-Detects**							
278					Mean in Original Scale	2.962					Mean in Log Scale	1.068
279					SD in Original Scale	0.57					SD in Log Scale	0.203
280					95% t UCL (assumes normality of ROS data)	3.257					95% Percentile Bootstrap UCL	3.221
281					95% BCA Bootstrap UCL	3.201					95% Bootstrap t UCL	3.238
282					95% H-UCL (Log ROS)	3.324						
283												
284					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
285					KM Mean (logged)	1.068					KM Geo Mean	2.908
286					KM SD (logged)	0.208					95% Critical H Value (KM-Log)	1.849
287					KM Standard Error of Mean (logged)	0.0786					95% H-UCL (KM -Log)	3.337
288					KM SD (logged)	0.208					95% Critical H Value (KM-Log)	1.849
289					KM Standard Error of Mean (logged)	0.0786						
290												
291					**DL/2 Statistics**							
292					**DL/2 Normal**						**DL/2 Log-Transformed**	
293					Mean in Original Scale	6.146					Mean in Log Scale	1.554
294					SD in Original Scale	4.718					SD in Log Scale	0.74
295					95% t UCL (Assumes normality)	8.592					95% H-Stat UCL	10.79
296					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
297												
298					**Nonparametric Distribution Free UCL Statistics**							
299					**Detected Data appear Normal Distributed at 5% Significance Level**							
300												
301					**Suggested UCL to Use**							
302					95% KM (t) UCL	3.359						
303												
304					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
305					Recommendations are based upon data size, data distribution, and skewness.							
306					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
307					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
308												
309	**Val_MANGANESE**											
310												
311					**General Statistics**							
312					Total Number of Observations	12					Number of Distinct Observations	10

313											Number of Missing Observations	0
314					Minimum	76.2					Mean	98.99
315					Maximum	119.5					Median	99.6
316					SD	13.09					Std. Error of Mean	3.779
317					Coefficient of Variation	0.132					Skewness	-0.395
318												
319					**Normal GOF Test**							
320					Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**					
321					5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level					
322					Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**					
323					5% Lilliefors Critical Value	0.243	Data appear Normal at 5% Significance Level					
324					**Data appear Normal at 5% Significance Level**							
325												
326					**Assuming Normal Distribution**							
327					**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**					
328					95% Student's-t UCL	105.8	95% Adjusted-CLT UCL (Chen-1995)	104.7				
329							95% Modified-t UCL (Johnson-1978)	105.7				
330												
331					**Gamma GOF Test**							
332					A-D Test Statistic	0.416	**Anderson-Darling Gamma GOF Test**					
333					5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level					
334					K-S Test Statistic	0.183	**Kolmogorov-Smirnov Gamma GOF Test**					
335					5% K-S Critical Value	0.245	Detected data appear Gamma Distributed at 5% Significance Level					
336					**Detected data appear Gamma Distributed at 5% Significance Level**							
337												
338					**Gamma Statistics**							
339					k hat (MLE)	59.72	k star (bias corrected MLE)	44.84				
340					Theta hat (MLE)	1.658	Theta star (bias corrected MLE)	2.208				
341					nu hat (MLE)	1433	nu star (bias corrected)	1076				
342					MLE Mean (bias corrected)	98.99	MLE Sd (bias corrected)	14.78				
343							Approximate Chi Square Value (0.05)	1001				
344					Adjusted Level of Significance	0.029	Adjusted Chi Square Value	990				
345												
346					**Assuming Gamma Distribution**							
347					95% Approximate Gamma UCL (use when n>=50))	106.4	95% Adjusted Gamma UCL (use when n<50)	107.6				
348												
349					**Lognormal GOF Test**							
350					Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**					
351					5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level					
352					Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**					
353					5% Lilliefors Critical Value	0.243	Data appear Lognormal at 5% Significance Level					
354					**Data appear Lognormal at 5% Significance Level**							
355												
356					**Lognormal Statistics**							
357					Minimum of Logged Data	4.333	Mean of logged Data	4.587				
358					Maximum of Logged Data	4.783	SD of logged Data	0.137				
359												
360					**Assuming Lognormal Distribution**							
361					95% H-UCL	106.7	90% Chebyshev (MVUE) UCL	110.8				
362					95% Chebyshev (MVUE) UCL	116.1	97.5% Chebyshev (MVUE) UCL	123.5				
363					99% Chebyshev (MVUE) UCL	138.1						
364												

365	**Nonparametric Distribution Free UCL Statistics**											
366	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
367												
368	**Nonparametric Distribution Free UCLs**											
369					95% CLT UCL	105.2			95% Jackknife UCL	105.8		
370					95% Standard Bootstrap UCL	105			95% Bootstrap-t UCL	105.5		
371					95% Hall's Bootstrap UCL	104.9			95% Percentile Bootstrap UCL	104.9		
372					95% BCA Bootstrap UCL	104.6						
373					90% Chebyshev(Mean, Sd) UCL	110.3			95% Chebyshev(Mean, Sd) UCL	115.5		
374					97.5% Chebyshev(Mean, Sd) UCL	122.6			99% Chebyshev(Mean, Sd) UCL	136.6		
375												
376	**Suggested UCL to Use**											
377					95% Student's-t UCL	105.8						
378												
379	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
380	Recommendations are based upon data size, data distribution, and skewness.											
381	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
382	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
383												
384	**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**											
385	**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**											
386												
387												
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417												
418												
419												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/27/2017 6:52:24 PM								
5			From File	SW455-Paradise Creek River SW_Formatted_Data_b.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10												
11	**Val_POTASSIUM_40**											
12												
13	**General Statistics**											
14				Total Number of Observations	12			Number of Distinct Observations	12			
15								Number of Missing Observations	0			
16				Minimum	99.7			Mean	153.7			
17				Maximum	194			Median	155			
18				SD	22.86			Std. Error of Mean	6.6			
19				Coefficient of Variation	0.149			Skewness	-0.809			
20												
21	**Normal GOF Test**											
22				Shapiro Wilk Test Statistic	0.932			**Shapiro Wilk GOF Test**				
23				5% Shapiro Wilk Critical Value	0.859			Data appear Normal at 5% Significance Level				
24				Lilliefors Test Statistic	0.154			**Lilliefors GOF Test**				
25				5% Lilliefors Critical Value	0.243			Data appear Normal at 5% Significance Level				
26	**Data appear Normal at 5% Significance Level**											
27												
28	**Assuming Normal Distribution**											
29				**95% Normal UCL**				**95% UCLs (Adjusted for Skewness)**				
30				95% Student's-t UCL	165.5			95% Adjusted-CLT UCL (Chen-1995)	162.9			
31								95% Modified-t UCL (Johnson-1978)	165.3			
32												
33	**Gamma GOF Test**											
34				A-D Test Statistic	0.506			**Anderson-Darling Gamma GOF Test**				
35				5% A-D Critical Value	0.73			Detected data appear Gamma Distributed at 5% Significance Level				
36				K-S Test Statistic	0.17			**Kolmogorov-Smirnov Gamma GOF Test**				
37				5% K-S Critical Value	0.245			Detected data appear Gamma Distributed at 5% Significance Level				
38	**Detected data appear Gamma Distributed at 5% Significance Level**											
39												
40	**Gamma Statistics**											
41				k hat (MLE)	44.2			k star (bias corrected MLE)	33.2			
42				Theta hat (MLE)	3.477			Theta star (bias corrected MLE)	4.629			
43				nu hat (MLE)	1061			nu star (bias corrected)	796.9			
44				MLE Mean (bias corrected)	153.7			MLE Sd (bias corrected)	26.67			
45								Approximate Chi Square Value (0.05)	732.4			
46				Adjusted Level of Significance	0.029			Adjusted Chi Square Value	722.9			
47												
48	**Assuming Gamma Distribution**											
49				95% Approximate Gamma UCL (use when n>=50))	167.2			95% Adjusted Gamma UCL (use when n<50)	169.4			
50												
51	**Lognormal GOF Test**											
52				Shapiro Wilk Test Statistic	0.876			**Shapiro Wilk Lognormal GOF Test**				

	A	B	C	D	E	F	G	H	I	J	K	L
53				5% Shapiro Wilk Critical Value		0.859			Data appear Lognormal at 5% Significance Level			
54				Lilliefors Test Statistic		0.188			**Lilliefors Lognormal GOF Test**			
55				5% Lilliefors Critical Value		0.243			Data appear Lognormal at 5% Significance Level			
56						**Data appear Lognormal at 5% Significance Level**						
57												
58						**Lognormal Statistics**						
59				Minimum of Logged Data		4.602				Mean of logged Data		5.024
60				Maximum of Logged Data		5.268				SD of logged Data		0.163
61												
62						**Assuming Lognormal Distribution**						
63				95% H-UCL		168.3				90% Chebyshev (MVUE) UCL		175.5
64				95% Chebyshev (MVUE) UCL		185.3				97.5% Chebyshev (MVUE) UCL		199
65				99% Chebyshev (MVUE) UCL		225.8						
66												
67						**Nonparametric Distribution Free UCL Statistics**						
68						**Data appear to follow a Discernible Distribution at 5% Significance Level**						
69												
70						**Nonparametric Distribution Free UCLs**						
71				95% CLT UCL		164.5				95% Jackknife UCL		165.5
72				95% Standard Bootstrap UCL		164.2				95% Bootstrap-t UCL		164.3
73				95% Hall's Bootstrap UCL		164.3				95% Percentile Bootstrap UCL		163.8
74				95% BCA Bootstrap UCL		162.9						
75				90% Chebyshev(Mean, Sd) UCL		173.5				95% Chebyshev(Mean, Sd) UCL		182.5
76				97.5% Chebyshev(Mean, Sd) UCL		194.9				99% Chebyshev(Mean, Sd) UCL		219.4
77												
78						**Suggested UCL to Use**						
79				95% Student's-t UCL		165.5						
80												
81						Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.						
82						Recommendations are based upon data size, data distribution, and skewness.						
83						These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).						
84						However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.						
85												
86						**Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be**						
87						**reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.**						
88												

Groundwater

	A	B	C	D	E	F	G	H	I	J	K	L
1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3				User Selected Options								
4				Date/Time of Computation	ProUCL 5.111/14/2017 4:51:47 PM							
5				From File	GW528-GW_RA_Formatted_Data.xls							
6				Full Precision	OFF							
7				Confidence Coefficient	95%							
8				Number of Bootstrap Operations	2000							
9												
10	**Val_CIS_12_DICHLOROETHENE**											
11												
12	**General Statistics**											
13						Total Number of Observations	100			Number of Distinct Observations		8
14						Number of Detects	8			Number of Non-Detects		92
15						Number of Distinct Detects	7			Number of Distinct Non-Detects		1
16						Minimum Detect	4.6			Minimum Non-Detect		5
17						Maximum Detect	45			Maximum Non-Detect		5
18						Variance Detects	337.4			Percent Non-Detects		92%
19						Mean Detects	22.24			SD Detects		18.37
20						Median Detects	21.65			CV Detects		0.826
21						Skewness Detects	0.0726			Kurtosis Detects		-2.602
22						Mean of Logged Detects	2.656			SD of Logged Detects		1.086
23												
24	**Normal GOF Test on Detects Only**											
25						Shapiro Wilk Test Statistic	0.755		**Shapiro Wilk GOF Test**			
26						5% Shapiro Wilk Critical Value	0.818		Detected Data Not Normal at 5% Significance Level			
27						Lilliefors Test Statistic	0.307		**Lilliefors GOF Test**			
28						5% Lilliefors Critical Value	0.283		Detected Data Not Normal at 5% Significance Level			
29	**Detected Data Not Normal at 5% Significance Level**											
30												
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
32						KM Mean	6.103			KM Standard Error of Mean		0.731
33						KM SD	6.802			95% KM (BCA) UCL		7.459
34						95% KM (t) UCL	7.316			95% KM (Percentile Bootstrap) UCL		7.298
35						95% KM (z) UCL	7.305			95% KM Bootstrap t UCL		8.003
36						90% KM Chebyshev UCL	8.295			95% KM Chebyshev UCL		9.287
37						97.5% KM Chebyshev UCL	10.67			99% KM Chebyshev UCL		13.37
38												
39	**Gamma GOF Tests on Detected Observations Only**											
40						A-D Test Statistic	1.095		**Anderson-Darling GOF Test**			
41						5% A-D Critical Value	0.732		Detected Data Not Gamma Distributed at 5% Significance Level			
42						K-S Test Statistic	0.319		**Kolmogorov-Smirnov GOF**			
43						5% K-S Critical Value	0.3		Detected Data Not Gamma Distributed at 5% Significance Level			
44	**Detected Data Not Gamma Distributed at 5% Significance Level**											
45												
46	**Gamma Statistics on Detected Data Only**											
47						k hat (MLE)	1.263			k star (bias corrected MLE)		0.873
48						Theta hat (MLE)	17.61			Theta star (bias corrected MLE)		25.48
49						nu hat (MLE)	20.21			nu star (bias corrected)		13.96
50						Mean (detects)	22.24					
51												
52	**Gamma ROS Statistics using Imputed Non-Detects**											

	A	B	C	D	E	F	G	H	I	J	K	L
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean		5.178
59					Maximum	45				Median		1.15
60					SD	8.673				CV		1.675
61					k hat (MLE)	0.257				k star (bias corrected MLE)		0.256
62					Theta hat (MLE)	20.16				Theta star (bias corrected MLE)		20.24
63					nu hat (MLE)	51.38				nu star (bias corrected)		51.17
64					Adjusted Level of Significance (β)	0.0476						
65					Approximate Chi Square Value (51.17, α)	35.74				Adjusted Chi Square Value (51.17, β)		35.55
66					95% Gamma Approximate UCL (use when n>=50)	7.412				95% Gamma Adjusted UCL (use when n<50)		7.452
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	6.103				SD (KM)		6.802
70					Variance (KM)	46.26				SE of Mean (KM)		0.731
71					k hat (KM)	0.805				k star (KM)		0.788
72					nu hat (KM)	161				nu star (KM)		157.5
73					theta hat (KM)	7.581				theta star (KM)		7.749
74					80% gamma percentile (KM)	9.982				90% gamma percentile (KM)		14.9
75					95% gamma percentile (KM)	19.91				99% gamma percentile (KM)		31.76
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (157.52, α)	129.5				Adjusted Chi Square Value (157.52, β)		129.1
79					95% Gamma Approximate KM-UCL (use when n>=50)	7.423				95% Gamma Adjusted KM-UCL (use when n<50)		7.444
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.743				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.818				Detected Data Not Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.31				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.283				Detected Data Not Lognormal at 5% Significance Level		
86	**Detected Data Not Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	6.402				Mean in Log Scale		1.49
90					SD in Original Scale	7.482				SD in Log Scale		0.812
91					95% t UCL (assumes normality of ROS data)	7.645				95% Percentile Bootstrap UCL		7.697
92					95% BCA Bootstrap UCL	7.975				95% Bootstrap t UCL		8.124
93					95% H-UCL (Log ROS)	7.315						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	1.636				KM Geo Mean		5.135
97					KM SD (logged)	0.416				95% Critical H Value (KM-Log)		1.805
98					KM Standard Error of Mean (logged)	0.047				95% H-UCL (KM -Log)		6.04
99					KM SD (logged)	0.416				95% Critical H Value (KM-Log)		1.805
100					KM Standard Error of Mean (logged)	0.047						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**						**DL/2 Log-Transformed**					
104					Mean in Original Scale	4.079				Mean in Log Scale		1.055

105					SD in Original Scale	7.268					SD in Log Scale	0.555
106					95% t UCL (Assumes normality)	5.286					95% H-Stat UCL	3.725
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Data do not follow a Discernible Distribution at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM (Chebyshev) UCL	9.287						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120	**Val_ALUMINUM_FUME_OR_DUST**											
121												
122	**General Statistics**											
123					Total Number of Observations	100					Number of Distinct Observations	67
124					Number of Detects	69					Number of Non-Detects	31
125					Number of Distinct Detects	66					Number of Distinct Non-Detects	2
126					Minimum Detect	2.5					Minimum Non-Detect	20
127					Maximum Detect	5730					Maximum Non-Detect	200
128					Variance Detects	1292279					Percent Non-Detects	31%
129					Mean Detects	527.8					SD Detects	1137
130					Median Detects	163					CV Detects	2.154
131					Skewness Detects	3.112					Kurtosis Detects	9.337
132					Mean of Logged Detects	4.922					SD of Logged Detects	1.643
133												
134	**Normal GOF Test on Detects Only**											
135					Shapiro Wilk Test Statistic	0.483	**Normal GOF Test on Detected Observations Only**					
136					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
137					Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**					
138					5% Lilliefors Critical Value	0.107	Detected Data Not Normal at 5% Significance Level					
139	**Detected Data Not Normal at 5% Significance Level**											
140												
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
142					KM Mean	372.1					KM Standard Error of Mean	97.35
143					KM SD	966.1					95% KM (BCA) UCL	557.1
144					95% KM (t) UCL	533.7					95% KM (Percentile Bootstrap) UCL	538.3
145					95% KM (z) UCL	532.2					95% KM Bootstrap t UCL	612.3
146					90% KM Chebyshev UCL	664.1					95% KM Chebyshev UCL	796.4
147					97.5% KM Chebyshev UCL	980					99% KM Chebyshev UCL	1341
148												
149	**Gamma GOF Tests on Detected Observations Only**											
150					A-D Test Statistic	4.426	**Anderson-Darling GOF Test**					
151					5% A-D Critical Value	0.823	Detected Data Not Gamma Distributed at 5% Significance Level					
152					K-S Test Statistic	0.25	**Kolmogorov-Smirnov GOF**					
153					5% K-S Critical Value	0.114	Detected Data Not Gamma Distributed at 5% Significance Level					
154	**Detected Data Not Gamma Distributed at 5% Significance Level**											
155												
156	**Gamma Statistics on Detected Data Only**											

157					k hat (MLE)	0.475				k star (bias corrected MLE)		0.464
158					Theta hat (MLE)	1110				Theta star (bias corrected MLE)		1137
159					nu hat (MLE)	65.6				nu star (bias corrected)		64.08
160					Mean (detects)	527.8						
161												
162	**Gamma ROS Statistics using Imputed Non-Detects**											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168					Minimum	0.01				Mean		367.8
169					Maximum	5730				Median		65.1
170					SD	972.6				CV		2.644
171					k hat (MLE)	0.197				k star (bias corrected MLE)		0.198
172					Theta hat (MLE)	1868				Theta star (bias corrected MLE)		1860
173					nu hat (MLE)	39.39				nu star (bias corrected)		39.54
174					Adjusted Level of Significance (β)	0.0476						
175					Approximate Chi Square Value (39.54, α)	26.14				Adjusted Chi Square Value (39.54, β)		25.98
176					95% Gamma Approximate UCL (use when n>=50)	556.5				95% Gamma Adjusted UCL (use when n<50)		559.9
177												
178	**Estimates of Gamma Parameters using KM Estimates**											
179					Mean (KM)	372.1				SD (KM)		966.1
180					Variance (KM)	933370				SE of Mean (KM)		97.35
181					k hat (KM)	0.148				k star (KM)		0.151
182					nu hat (KM)	29.67				nu star (KM)		30.11
183					theta hat (KM)	2508				theta star (KM)		2471
184					80% gamma percentile (KM)	406.3				90% gamma percentile (KM)		1104
185					95% gamma percentile (KM)	2047				99% gamma percentile (KM)		4780
186												
187	**Gamma Kaplan-Meier (KM) Statistics**											
188					Approximate Chi Square Value (30.11, α)	18.58				Adjusted Chi Square Value (30.11, β)		18.45
189					95% Gamma Approximate KM-UCL (use when n>=50)	603				95% Gamma Adjusted KM-UCL (use when n<50)		607.4
190												
191	**Lognormal GOF Test on Detected Observations Only**											
192					Shapiro Wilk Approximate Test Statistic	0.956				**Shapiro Wilk GOF Test**		
193					5% Shapiro Wilk P Value	0.0458				Detected Data Not Lognormal at 5% Significance Level		
194					Lilliefors Test Statistic	0.125				**Lilliefors GOF Test**		
195					5% Lilliefors Critical Value	0.107				Detected Data Not Lognormal at 5% Significance Level		
196	**Detected Data Not Lognormal at 5% Significance Level**											
197												
198	**Lognormal ROS Statistics Using Imputed Non-Detects**											
199					Mean in Original Scale	371.5				Mean in Log Scale		4.142
200					SD in Original Scale	971.1				SD in Log Scale		1.92
201					95% t UCL (assumes normality of ROS data)	532.7				95% Percentile Bootstrap UCL		546.8
202					95% BCA Bootstrap UCL	577.6				95% Bootstrap t UCL		617.5
203					95% H-UCL (Log ROS)	753.8						
204												
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
206					KM Mean (logged)	4.098				KM Geo Mean		60.24
207					KM SD (logged)	1.954				95% Critical H Value (KM-Log)		3.36
208					KM Standard Error of Mean (logged)	0.213				95% H-UCL (KM -Log)		785.4

209	KM SD (logged)					1.954	95% Critical H Value (KM-Log)					3.36
210	KM Standard Error of Mean (logged)					0.213						
211												
212	**DL/2 Statistics**											
213	**DL/2 Normal**						**DL/2 Log-Transformed**					
214	Mean in Original Scale					377.2	Mean in Log Scale					4.363
215	SD in Original Scale					969.1	SD in Log Scale					1.714
216	95% t UCL (Assumes normality)					538.1	95% H-Stat UCL					577.2
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Data do not follow a Discernible Distribution at 5% Significance Level**											
221												
222	**Suggested UCL to Use**											
223	95% KM (Chebyshev) UCL					796.4						
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness.											
227	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
228	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
229												
230	**Val_ARSENIC**											
231												
232	**General Statistics**											
233	Total Number of Observations					100	Number of Distinct Observations					75
234	Number of Detects					93	Number of Non-Detects					7
235	Number of Distinct Detects					73	Number of Distinct Non-Detects					2
236	Minimum Detect					0.28	Minimum Non-Detect					1
237	Maximum Detect					41.2	Maximum Non-Detect					10
238	Variance Detects					94.82	Percent Non-Detects					7%
239	Mean Detects					10.81	SD Detects					9.738
240	Median Detects					7.6	CV Detects					0.901
241	Skewness Detects					1.031	Kurtosis Detects					0.274
242	Mean of Logged Detects					1.88	SD of Logged Detects					1.11
243												
244	**Normal GOF Test on Detects Only**											
245	Shapiro Wilk Test Statistic					0.859	**Normal GOF Test on Detected Observations Only**					
246	5% Shapiro Wilk P Value					1.499E-12	Detected Data Not Normal at 5% Significance Level					
247	Lilliefors Test Statistic					0.157	**Lilliefors GOF Test**					
248	5% Lilliefors Critical Value					0.0921	Detected Data Not Normal at 5% Significance Level					
249	**Detected Data Not Normal at 5% Significance Level**											
250												
251	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
252	KM Mean					10.17	KM Standard Error of Mean					0.971
253	KM SD					9.644	95% KM (BCA) UCL					11.61
254	95% KM (t) UCL					11.78	95% KM (Percentile Bootstrap) UCL					11.72
255	95% KM (z) UCL					11.77	95% KM Bootstrap t UCL					11.87
256	90% KM Chebyshev UCL					13.08	95% KM Chebyshev UCL					14.4
257	97.5% KM Chebyshev UCL					16.23	99% KM Chebyshev UCL					19.83
258												
259	**Gamma GOF Tests on Detected Observations Only**											
260	A-D Test Statistic					1.38	**Anderson-Darling GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
261					5% A-D Critical Value	0.78	Detected Data Not Gamma Distributed at 5% Significance Level					
262					K-S Test Statistic	0.119	**Kolmogorov-Smirnov GOF**					
263					5% K-S Critical Value	0.0953	Detected Data Not Gamma Distributed at 5% Significance Level					
264	**Detected Data Not Gamma Distributed at 5% Significance Level**											
265												
266	**Gamma Statistics on Detected Data Only**											
267					k hat (MLE)	1.138				k star (bias corrected MLE)		1.108
268					Theta hat (MLE)	9.498				Theta star (bias corrected MLE)		9.751
269					nu hat (MLE)	211.7				nu star (bias corrected)		206.2
270					Mean (detects)	10.81						
271												
272	**Gamma ROS Statistics using Imputed Non-Detects**											
273	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
274	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
275	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
276	This is especially true when the sample size is small.											
277	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
278					Minimum	0.01				Mean		10.17
279					Maximum	41.2				Median		6.757
280					SD	9.69				CV		0.952
281					k hat (MLE)	0.871				k star (bias corrected MLE)		0.851
282					Theta hat (MLE)	11.68				Theta star (bias corrected MLE)		11.95
283					nu hat (MLE)	174.2				nu star (bias corrected)		170.3
284					Adjusted Level of Significance (β)	0.0476						
285					Approximate Chi Square Value (170.27, α)	141.1				Adjusted Chi Square Value (170.27, β)		140.7
286					95% Gamma Approximate UCL (use when n>=50)	12.28				95% Gamma Adjusted UCL (use when n<50)		12.31
287												
288	**Estimates of Gamma Parameters using KM Estimates**											
289					Mean (KM)	10.17				SD (KM)		9.644
290					Variance (KM)	93.02				SE of Mean (KM)		0.971
291					k hat (KM)	1.112				k star (KM)		1.086
292					nu hat (KM)	222.5				nu star (KM)		217.1
293					theta hat (KM)	9.145				theta star (KM)		9.37
294					80% gamma percentile (KM)	16.26				90% gamma percentile (KM)		22.95
295					95% gamma percentile (KM)	29.6				99% gamma percentile (KM)		44.96
296												
297	**Gamma Kaplan-Meier (KM) Statistics**											
298					Approximate Chi Square Value (217.12, α)	184				Adjusted Chi Square Value (217.12, β)		183.6
299					95% Gamma Approximate KM-UCL (use when n>=50)	12				95% Gamma Adjusted KM-UCL (use when n<50)		12.03
300												
301	**Lognormal GOF Test on Detected Observations Only**											
302					Shapiro Wilk Approximate Test Statistic	0.939	**Shapiro Wilk GOF Test**					
303					5% Shapiro Wilk P Value	3.6994E-4	Detected Data Not Lognormal at 5% Significance Level					
304					Lilliefors Test Statistic	0.121	**Lilliefors GOF Test**					
305					5% Lilliefors Critical Value	0.0921	Detected Data Not Lognormal at 5% Significance Level					
306	**Detected Data Not Lognormal at 5% Significance Level**											
307												
308	**Lognormal ROS Statistics Using Imputed Non-Detects**											
309					Mean in Original Scale	10.18				Mean in Log Scale		1.761
310					SD in Original Scale	9.678				SD in Log Scale		1.179
311					95% t UCL (assumes normality of ROS data)	11.78				95% Percentile Bootstrap UCL		11.88
312					95% BCA Bootstrap UCL	11.87				95% Bootstrap t UCL		11.92

313					95% H-UCL (Log ROS)	15.58						
314												
315	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
316					KM Mean (logged)	1.728				KM Geo Mean		5.63
317					KM SD (logged)	1.245				95% Critical H Value (KM-Log)		2.511
318					KM Standard Error of Mean (logged)	0.126				95% H-UCL (KM -Log)		16.72
319					KM SD (logged)	1.245				95% Critical H Value (KM-Log)		2.511
320					KM Standard Error of Mean (logged)	0.126						
321												
322	**DL/2 Statistics**											
323	**DL/2 Normal**						**DL/2 Log-Transformed**					
324					Mean in Original Scale	10.22				Mean in Log Scale		1.769
325					SD in Original Scale	9.648				SD in Log Scale		1.185
326					95% t UCL (Assumes normality)	11.82				95% H-Stat UCL		15.83
327	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
328												
329	**Nonparametric Distribution Free UCL Statistics**											
330	**Data do not follow a Discernible Distribution at 5% Significance Level**											
331												
332	**Suggested UCL to Use**											
333					95% KM (Chebyshev) UCL	14.4						
334												
335	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
336	Recommendations are based upon data size, data distribution, and skewness.											
337	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
338	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
339												
340												
341	**Val_BARIUM**											
342												
343	**General Statistics**											
344					Total Number of Observations	100				Number of Distinct Observations		95
345										Number of Missing Observations		0
346					Minimum	15.3				Mean		207.2
347					Maximum	1415				Median		77.85
348					SD	268.7				Std. Error of Mean		26.87
349					Coefficient of Variation	1.297				Skewness		2.044
350												
351	**Normal GOF Test**											
352					Shapiro Wilk Test Statistic	0.716	**Shapiro Wilk GOF Test**					
353					5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level					
354					Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**					
355					5% Lilliefors Critical Value	0.0889	Data Not Normal at 5% Significance Level					
356	**Data Not Normal at 5% Significance Level**											
357												
358	**Assuming Normal Distribution**											
359	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
360					95% Student's-t UCL	251.8				95% Adjusted-CLT UCL (Chen-1995)		257.3
361										95% Modified-t UCL (Johnson-1978)		252.7
362												
363	**Gamma GOF Test**											
364					A-D Test Statistic	4.118	**Anderson-Darling Gamma GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
365					5% A-D Critical Value	0.792	Data Not Gamma Distributed at 5% Significance Level					
366					K-S Test Statistic	0.165	**Kolmogorov-Smirnov Gamma GOF Test**					
367					5% K-S Critical Value	0.0927	Data Not Gamma Distributed at 5% Significance Level					
368	**Data Not Gamma Distributed at 5% Significance Level**											
369												
370	**Gamma Statistics**											
371					k hat (MLE)	0.814				k star (bias corrected MLE)		0.796
372					Theta hat (MLE)	254.7				Theta star (bias corrected MLE)		260.4
373					nu hat (MLE)	162.7				nu star (bias corrected)		159.2
374					MLE Mean (bias corrected)	207.2				MLE Sd (bias corrected)		232.3
375										Approximate Chi Square Value (0.05)		131
376					Adjusted Level of Significance	0.0476				Adjusted Chi Square Value		130.6
377												
378	**Assuming Gamma Distribution**											
379				95% Approximate Gamma UCL (use when n>=50))		251.8				95% Adjusted Gamma UCL (use when n<50)		252.5
380												
381	**Lognormal GOF Test**											
382					Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk Lognormal GOF Test**					
383					5% Shapiro Wilk P Value	2.9857E-6	Data Not Lognormal at 5% Significance Level					
384					Lilliefors Test Statistic	0.115	**Lilliefors Lognormal GOF Test**					
385					5% Lilliefors Critical Value	0.0889	Data Not Lognormal at 5% Significance Level					
386	**Data Not Lognormal at 5% Significance Level**											
387												
388	**Lognormal Statistics**											
389					Minimum of Logged Data	2.728				Mean of logged Data		4.606
390					Maximum of Logged Data	7.255				SD of logged Data		1.206
391												
392	**Assuming Lognormal Distribution**											
393					95% H-UCL	279.1				90% Chebyshev (MVUE) UCL		298.6
394					95% Chebyshev (MVUE) UCL	341.3				97.5% Chebyshev (MVUE) UCL		400.5
395					99% Chebyshev (MVUE) UCL	516.8						
396												
397	**Nonparametric Distribution Free UCL Statistics**											
398	**Data do not follow a Discernible Distribution (0.05)**											
399												
400	**Nonparametric Distribution Free UCLs**											
401					95% CLT UCL	251.4				95% Jackknife UCL		251.8
402					95% Standard Bootstrap UCL	250.7				95% Bootstrap-t UCL		260.2
403					95% Hall's Bootstrap UCL	259.8				95% Percentile Bootstrap UCL		253.5
404					95% BCA Bootstrap UCL	255.5						
405					90% Chebyshev(Mean, Sd) UCL	287.8				95% Chebyshev(Mean, Sd) UCL		324.3
406					97.5% Chebyshev(Mean, Sd) UCL	375				99% Chebyshev(Mean, Sd) UCL		474.5
407												
408	**Suggested UCL to Use**											
409					95% Chebyshev (Mean, Sd) UCL	324.3						
410												
411	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
412	Recommendations are based upon data size, data distribution, and skewness.											
413	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
414	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
415												
416	**Val_CADMIUM**											

	A	B	C	D	E	F	G	H	I	J	K	L
417												
418	**General Statistics**											
419	Total Number of Observations					100	Number of Distinct Observations					21
420	Number of Detects					22	Number of Non-Detects					78
421	Number of Distinct Detects					19	Number of Distinct Non-Detects					2
422	Minimum Detect					0.075	Minimum Non-Detect					1
423	Maximum Detect					7.2	Maximum Non-Detect					5
424	Variance Detects					2.815	Percent Non-Detects					78%
425	Mean Detects					1.203	SD Detects					1.678
426	Median Detects					0.568	CV Detects					1.394
427	Skewness Detects					2.613	Kurtosis Detects					7.63
428	Mean of Logged Detects					-0.564	SD of Logged Detects					1.291
429												
430	**Normal GOF Test on Detects Only**											
431	Shapiro Wilk Test Statistic					0.669	**Shapiro Wilk GOF Test**					
432	5% Shapiro Wilk Critical Value					0.911	Detected Data Not Normal at 5% Significance Level					
433	Lilliefors Test Statistic					0.273	**Lilliefors GOF Test**					
434	5% Lilliefors Critical Value					0.184	Detected Data Not Normal at 5% Significance Level					
435	**Detected Data Not Normal at 5% Significance Level**											
436												
437	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
438	KM Mean					0.561	KM Standard Error of Mean					0.11
439	KM SD					0.894	95% KM (BCA) UCL					0.762
440	95% KM (t) UCL					0.744	95% KM (Percentile Bootstrap) UCL					0.744
441	95% KM (z) UCL					0.742	95% KM Bootstrap t UCL					0.793
442	90% KM Chebyshev UCL					0.892	95% KM Chebyshev UCL					1.041
443	97.5% KM Chebyshev UCL					1.249	99% KM Chebyshev UCL					1.657
444												
445	**Gamma GOF Tests on Detected Observations Only**											
446	A-D Test Statistic					0.458	**Anderson-Darling GOF Test**					
447	5% A-D Critical Value					0.781	Detected data appear Gamma Distributed at 5% Significance Level					
448	K-S Test Statistic					0.155	**Kolmogorov-Smirnov GOF**					
449	5% K-S Critical Value					0.192	Detected data appear Gamma Distributed at 5% Significance Level					
450	**Detected data appear Gamma Distributed at 5% Significance Level**											
451												
452	**Gamma Statistics on Detected Data Only**											
453	k hat (MLE)					0.793	k star (bias corrected MLE)					0.715
454	Theta hat (MLE)					1.517	Theta star (bias corrected MLE)					1.682
455	nu hat (MLE)					34.9	nu star (bias corrected)					31.48
456	Mean (detects)					1.203						
457												
458	**Gamma ROS Statistics using Imputed Non-Detects**											
459	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
460	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
461	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
462	This is especially true when the sample size is small.											
463	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
464	Minimum					0.01	Mean					0.554
465	Maximum					7.2	Median					0.209
466	SD					0.959	CV					1.73
467	k hat (MLE)					0.429	k star (bias corrected MLE)					0.423
468	Theta hat (MLE)					1.291	Theta star (bias corrected MLE)					1.31

	A	B	C	D	E	F	G	H	I	J	K	L
469					nu hat (MLE)	85.82				nu star (bias corrected)		84.58
470					Adjusted Level of Significance (β)	0.0476						
471					Approximate Chi Square Value (84.58, α)	64.38				Adjusted Chi Square Value (84.58, β)		64.13
472					95% Gamma Approximate UCL (use when n>=50)	0.728				95% Gamma Adjusted UCL (use when n<50)		0.731
473												
474	**Estimates of Gamma Parameters using KM Estimates**											
475					Mean (KM)	0.561				SD (KM)		0.894
476					Variance (KM)	0.8				SE of Mean (KM)		0.11
477					k hat (KM)	0.394				k star (KM)		0.389
478					nu hat (KM)	78.74				nu star (KM)		77.71
479					theta hat (KM)	1.425				theta star (KM)		1.444
480					80% gamma percentile (KM)	0.902				90% gamma percentile (KM)		1.593
481					95% gamma percentile (KM)	2.355				99% gamma percentile (KM)		4.276
482												
483	**Gamma Kaplan-Meier (KM) Statistics**											
484					Approximate Chi Square Value (77.71, α)	58.4				Adjusted Chi Square Value (77.71, β)		58.16
485					95% Gamma Approximate KM-UCL (use when n>=50)	0.747				95% Gamma Adjusted KM-UCL (use when n<50)		0.75
486												
487	**Lognormal GOF Test on Detected Observations Only**											
488					Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**					
489					5% Shapiro Wilk Critical Value	0.911	Detected Data appear Lognormal at 5% Significance Level					
490					Lilliefors Test Statistic	0.0745	**Lilliefors GOF Test**					
491					5% Lilliefors Critical Value	0.184	Detected Data appear Lognormal at 5% Significance Level					
492	**Detected Data appear Lognormal at 5% Significance Level**											
493												
494	**Lognormal ROS Statistics Using Imputed Non-Detects**											
495					Mean in Original Scale	0.561				Mean in Log Scale		-1.165
496					SD in Original Scale	0.891				SD in Log Scale		1.051
497					95% t UCL (assumes normality of ROS data)	0.709				95% Percentile Bootstrap UCL		0.727
498					95% BCA Bootstrap UCL	0.779				95% Bootstrap t UCL		0.825
499					95% H-UCL (Log ROS)	0.691						
500												
501	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
502					KM Mean (logged)	-1.139				KM Geo Mean		0.32
503					KM SD (logged)	1.001				95% Critical H Value (KM-Log)		2.258
504					KM Standard Error of Mean (logged)	0.214				95% H-UCL (KM -Log)		0.663
505					KM SD (logged)	1.001				95% Critical H Value (KM-Log)		2.258
506					KM Standard Error of Mean (logged)	0.214						
507												
508	**DL/2 Statistics**											
509	**DL/2 Normal**						**DL/2 Log-Transformed**					
510					Mean in Original Scale	0.935				Mean in Log Scale		-0.439
511					SD in Original Scale	1.04				SD in Log Scale		0.812
512					95% t UCL (Assumes normality)	1.107				95% H-Stat UCL		1.062
513	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
514												
515	**Nonparametric Distribution Free UCL Statistics**											
516	**Detected Data appear Gamma Distributed at 5% Significance Level**											
517												
518	**Suggested UCL to Use**											
519					95% KM Approximate Gamma UCL	0.747						
520												

521	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
522	Recommendations are based upon data size, data distribution, and skewness.											
523	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
524	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
525												
526	**Val_CHROMIUM**											
527												
528	**General Statistics**											
529						Total Number of Observations	100				Number of Distinct Observations	45	
530						Number of Detects	51				Number of Non-Detects	49	
531						Number of Distinct Detects	44				Number of Distinct Non-Detects	3	
532						Minimum Detect	0.18				Minimum Non-Detect	2	
533						Maximum Detect	206				Maximum Non-Detect	10	
534						Variance Detects	1047				Percent Non-Detects	49%	
535						Mean Detects	10.27				SD Detects	32.36	
536						Median Detects	2				CV Detects	3.15	
537						Skewness Detects	5.125				Kurtosis Detects	28.57	
538						Mean of Logged Detects	0.691				SD of Logged Detects	1.577	
539													
540	**Normal GOF Test on Detects Only**											
541						Shapiro Wilk Test Statistic	0.339	**Normal GOF Test on Detected Observations Only**				
542						5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level				
543						Lilliefors Test Statistic	0.396	**Lilliefors GOF Test**				
544						5% Lilliefors Critical Value	0.123	Detected Data Not Normal at 5% Significance Level				
545	**Detected Data Not Normal at 5% Significance Level**											
546												
547	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
548						KM Mean	5.742				KM Standard Error of Mean	2.361	
549						KM SD	23.36				95% KM (BCA) UCL	10.39	
550						95% KM (t) UCL	9.662				95% KM (Percentile Bootstrap) UCL	9.882	
551						95% KM (z) UCL	9.626				95% KM Bootstrap t UCL	19.36	
552						90% KM Chebyshev UCL	12.83				95% KM Chebyshev UCL	16.03	
553						97.5% KM Chebyshev UCL	20.49				99% KM Chebyshev UCL	29.23	
554													
555	**Gamma GOF Tests on Detected Observations Only**											
556						A-D Test Statistic	4.783	**Anderson-Darling GOF Test**				
557						5% A-D Critical Value	0.838	Detected Data Not Gamma Distributed at 5% Significance Level				
558						K-S Test Statistic	0.263	**Kolmogorov-Smirnov GOF**				
559						5% K-S Critical Value	0.133	Detected Data Not Gamma Distributed at 5% Significance Level				
560	**Detected Data Not Gamma Distributed at 5% Significance Level**											
561													
562	**Gamma Statistics on Detected Data Only**											
563						k hat (MLE)	0.401				k star (bias corrected MLE)	0.391	
564						Theta hat (MLE)	25.59				Theta star (bias corrected MLE)	26.28	
565						nu hat (MLE)	40.95				nu star (bias corrected)	39.87	
566						Mean (detects)	10.27						
567													
568	**Gamma ROS Statistics using Imputed Non-Detects**											
569	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
570	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
571	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
572	This is especially true when the sample size is small.											

	A	B	C	D	E	F	G	H	I	J	K	L
573	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
574					Minimum	0.01				Mean		5.746
575					Maximum	206				Median		0.275
576					SD	23.63				CV		4.112
577					k hat (MLE)	0.22				k star (bias corrected MLE)		0.22
578					Theta hat (MLE)	26.16				Theta star (bias corrected MLE)		26.15
579					nu hat (MLE)	43.93				nu star (bias corrected)		43.94
580					Adjusted Level of Significance (β)	0.0476						
581					Approximate Chi Square Value (43.94, α)	29.74				Adjusted Chi Square Value (43.94, β)		29.57
582					95% Gamma Approximate UCL (use when n>=50)	8.489				95% Gamma Adjusted UCL (use when n<50)		8.538
583												
584	**Estimates of Gamma Parameters using KM Estimates**											
585					Mean (KM)	5.742				SD (KM)		23.36
586					Variance (KM)	545.6				SE of Mean (KM)		2.361
587					k hat (KM)	0.0604				k star (KM)		0.0653
588					nu hat (KM)	12.09				nu star (KM)		13.06
589					theta hat (KM)	95.02				theta star (KM)		87.96
590					80% gamma percentile (KM)	1.737				90% gamma percentile (KM)		11.69
591					95% gamma percentile (KM)	32.7				99% gamma percentile (KM)		111.6
592												
593	**Gamma Kaplan-Meier (KM) Statistics**											
594					Approximate Chi Square Value (13.06, α)	5.93				Adjusted Chi Square Value (13.06, β)		5.86
595					95% Gamma Approximate KM-UCL (use when n>=50)	12.64				95% Gamma Adjusted KM-UCL (use when n<50)		12.79
596												
597	**Lognormal GOF Test on Detected Observations Only**											
598					Shapiro Wilk Approximate Test Statistic	0.941				**Shapiro Wilk GOF Test**		
599					5% Shapiro Wilk P Value	0.0197				Detected Data Not Lognormal at 5% Significance Level		
600					Lilliefors Test Statistic	0.103				**Lilliefors GOF Test**		
601					5% Lilliefors Critical Value	0.123				Detected Data appear Lognormal at 5% Significance Level		
602	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
603												
604	**Lognormal ROS Statistics Using Imputed Non-Detects**											
605					Mean in Original Scale	5.782				Mean in Log Scale		0.163
606					SD in Original Scale	23.47				SD in Log Scale		1.442
607					95% t UCL (assumes normality of ROS data)	9.679				95% Percentile Bootstrap UCL		10.12
608					95% BCA Bootstrap UCL	12.33				95% Bootstrap t UCL		18.79
609					95% H-UCL (Log ROS)	4.952						
610												
611	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
612					KM Mean (logged)	0.172				KM Geo Mean		1.188
613					KM SD (logged)	1.373				95% Critical H Value (KM-Log)		2.654
614					KM Standard Error of Mean (logged)	0.165				95% H-UCL (KM -Log)		4.396
615					KM SD (logged)	1.373				95% Critical H Value (KM-Log)		2.654
616					KM Standard Error of Mean (logged)	0.165						
617												
618	**DL/2 Statistics**											
619	**DL/2 Normal**						**DL/2 Log-Transformed**					
620					Mean in Original Scale	6.345				Mean in Log Scale		0.606
621					SD in Original Scale	23.38				SD in Log Scale		1.236
622					95% t UCL (Assumes normality)	10.23				95% H-Stat UCL		5.371
623	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
624												

	A	B	C	D	E	F	G	H	I	J	K	L
625	**Nonparametric Distribution Free UCL Statistics**											
626	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
627												
628	**Suggested UCL to Use**											
629	KM H-UCL					4.396						
630												
631	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
632	Recommendations are based upon data size, data distribution, and skewness.											
633	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
634	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
635												
636	**Val_CHROMIUM_HEXAVALENT_COMPOUNDS**											
637												
638	**General Statistics**											
639	Total Number of Observations					94			Number of Distinct Observations			39
640	Number of Detects					38			Number of Non-Detects			56
641	Number of Distinct Detects					32			Number of Distinct Non-Detects			8
642	Minimum Detect					2			Minimum Non-Detect			1
643	Maximum Detect					120			Maximum Non-Detect			100
644	Variance Detects					418.2			Percent Non-Detects			59.57%
645	Mean Detects					18.97			SD Detects			20.45
646	Median Detects					12.5			CV Detects			1.078
647	Skewness Detects					3.424			Kurtosis Detects			15.92
648	Mean of Logged Detects					2.531			SD of Logged Detects			0.94
649												
650	**Normal GOF Test on Detects Only**											
651	Shapiro Wilk Test Statistic					0.679			**Shapiro Wilk GOF Test**			
652	5% Shapiro Wilk Critical Value					0.938			Detected Data Not Normal at 5% Significance Level			
653	Lilliefors Test Statistic					0.203			**Lilliefors GOF Test**			
654	5% Lilliefors Critical Value					0.142			Detected Data Not Normal at 5% Significance Level			
655	**Detected Data Not Normal at 5% Significance Level**											
656												
657	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
658	KM Mean					9.115			KM Standard Error of Mean			1.639
659	KM SD					15.41			95% KM (BCA) UCL			12.24
660	95% KM (t) UCL					11.84			95% KM (Percentile Bootstrap) UCL			12.03
661	95% KM (z) UCL					11.81			95% KM Bootstrap t UCL			13.09
662	90% KM Chebyshev UCL					14.03			95% KM Chebyshev UCL			16.26
663	97.5% KM Chebyshev UCL					19.35			99% KM Chebyshev UCL			25.42
664												
665	**Gamma GOF Tests on Detected Observations Only**											
666	A-D Test Statistic					0.365			**Anderson-Darling GOF Test**			
667	5% A-D Critical Value					0.769			Detected data appear Gamma Distributed at 5% Significance Level			
668	K-S Test Statistic					0.0782			**Kolmogorov-Smirnov GOF**			
669	5% K-S Critical Value					0.146			Detected data appear Gamma Distributed at 5% Significance Level			
670	**Detected data appear Gamma Distributed at 5% Significance Level**											
671												
672	**Gamma Statistics on Detected Data Only**											
673	k hat (MLE)					1.357			k star (bias corrected MLE)			1.267
674	Theta hat (MLE)					13.98			Theta star (bias corrected MLE)			14.97
675	nu hat (MLE)					103.1			nu star (bias corrected)			96.31
676	Mean (detects)					18.97						

677											
678	**Gamma ROS Statistics using Imputed Non-Detects**										
679	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs										
680	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)										
681	For such situations, GROS method may yield incorrect values of UCLs and BTVs										
682	This is especially true when the sample size is small.										
683	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates										
684					Minimum	0.01			Mean	8.141	
685					Maximum	120			Median	0.403	
686					SD	15.79			CV	1.94	
687					k hat (MLE)	0.223			k star (bias corrected MLE)	0.223	
688					Theta hat (MLE)	36.51			Theta star (bias corrected MLE)	36.52	
689					nu hat (MLE)	41.92			nu star (bias corrected)	41.91	
690					Adjusted Level of Significance (β)	0.0474					
691					Approximate Chi Square Value (41.91, α)	28.07			Adjusted Chi Square Value (41.91, β)	27.9	
692					95% Gamma Approximate UCL (use when n>=50)	12.15			95% Gamma Adjusted UCL (use when n<50)	12.23	
693											
694	**Estimates of Gamma Parameters using KM Estimates**										
695					Mean (KM)	9.115			SD (KM)	15.41	
696					Variance (KM)	237.5			SE of Mean (KM)	1.639	
697					k hat (KM)	0.35			k star (KM)	0.346	
698					nu hat (KM)	65.75			nu star (KM)	64.99	
699					theta hat (KM)	26.06			theta star (KM)	26.37	
700					80% gamma percentile (KM)	14.4			90% gamma percentile (KM)	26.37	
701					95% gamma percentile (KM)	39.8			99% gamma percentile (KM)	74.12	
702											
703	**Gamma Kaplan-Meier (KM) Statistics**										
704					Approximate Chi Square Value (64.99, α)	47.44			Adjusted Chi Square Value (64.99, β)	47.21	
705					95% Gamma Approximate KM-UCL (use when n>=50)	12.49			95% Gamma Adjusted KM-UCL (use when n<50)	12.55	
706											
707	**Lognormal GOF Test on Detected Observations Only**										
708					Shapiro Wilk Test Statistic	0.973			**Shapiro Wilk GOF Test**		
709					5% Shapiro Wilk Critical Value	0.938			Detected Data appear Lognormal at 5% Significance Level		
710					Lilliefors Test Statistic	0.0963			**Lilliefors GOF Test**		
711					5% Lilliefors Critical Value	0.142			Detected Data appear Lognormal at 5% Significance Level		
712	**Detected Data appear Lognormal at 5% Significance Level**										
713											
714	**Lognormal ROS Statistics Using Imputed Non-Detects**										
715					Mean in Original Scale	9.1			Mean in Log Scale	1.328	
716					SD in Original Scale	15.35			SD in Log Scale	1.355	
717					95% t UCL (assumes normality of ROS data)	11.73			95% Percentile Bootstrap UCL	11.76	
718					95% BCA Bootstrap UCL	12.72			95% Bootstrap t UCL	13.03	
719					95% H-UCL (Log ROS)	13.67					
720											
721	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**										
722					KM Mean (logged)	1.299			KM Geo Mean	3.665	
723					KM SD (logged)	1.321			95% Critical H Value (KM-Log)	2.584	
724					KM Standard Error of Mean (logged)	0.159			95% H-UCL (KM -Log)	12.49	
725					KM SD (logged)	1.321			95% Critical H Value (KM-Log)	2.584	
726					KM Standard Error of Mean (logged)	0.159					
727											
728	**DL/2 Statistics**										

729	**DL/2 Normal**						**DL/2 Log-Transformed**					
730					Mean in Original Scale	10.7					Mean in Log Scale	1.586
731					SD in Original Scale	15.75					SD in Log Scale	1.373
732					95% t UCL (Assumes normality)	13.39					95% H-Stat UCL	18.25
733	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
734												
735	**Nonparametric Distribution Free UCL Statistics**											
736	**Detected Data appear Gamma Distributed at 5% Significance Level**											
737												
738	**Suggested UCL to Use**											
739					95% KM Approximate Gamma UCL	12.49					95% GROS Approximate Gamma UCL	12.15
740												
741	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
742	Recommendations are based upon data size, data distribution, and skewness.											
743	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
744	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
745												
746	**Val_COBALT**											
747												
748	**General Statistics**											
749					Total Number of Observations	100					Number of Distinct Observations	60
750					Number of Detects	69					Number of Non-Detects	31
751					Number of Distinct Detects	59					Number of Distinct Non-Detects	2
752					Minimum Detect	0.16					Minimum Non-Detect	1
753					Maximum Detect	549.5					Maximum Non-Detect	50
754					Variance Detects	7163					Percent Non-Detects	31%
755					Mean Detects	23.85					SD Detects	84.63
756					Median Detects	2.4					CV Detects	3.548
757					Skewness Detects	4.873					Kurtosis Detects	25.3
758					Mean of Logged Detects	0.897					SD of Logged Detects	1.852
759												
760	**Normal GOF Test on Detects Only**											
761					Shapiro Wilk Test Statistic	0.314	**Normal GOF Test on Detected Observations Only**					
762					5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level					
763					Lilliefors Test Statistic	0.464	**Lilliefors GOF Test**					
764					5% Lilliefors Critical Value	0.107	Detected Data Not Normal at 5% Significance Level					
765	**Detected Data Not Normal at 5% Significance Level**											
766												
767	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
768					KM Mean	17.18					KM Standard Error of Mean	7.107
769					KM SD	70.53					95% KM (BCA) UCL	29.99
770					95% KM (t) UCL	28.98					95% KM (Percentile Bootstrap) UCL	29.81
771					95% KM (z) UCL	28.87					95% KM Bootstrap t UCL	41.84
772					90% KM Chebyshev UCL	38.5					95% KM Chebyshev UCL	48.16
773					97.5% KM Chebyshev UCL	61.56					99% KM Chebyshev UCL	87.9
774												
775	**Gamma GOF Tests on Detected Observations Only**											
776					A-D Test Statistic	7.889	**Anderson-Darling GOF Test**					
777					5% A-D Critical Value	0.865	Detected Data Not Gamma Distributed at 5% Significance Level					
778					K-S Test Statistic	0.268	**Kolmogorov-Smirnov GOF**					
779					5% K-S Critical Value	0.116	Detected Data Not Gamma Distributed at 5% Significance Level					
780	**Detected Data Not Gamma Distributed at 5% Significance Level**											

	A	B	C	D	E	F	G	H	I	J	K	L
781												
782	**Gamma Statistics on Detected Data Only**											
783					k hat (MLE)	0.303			k star (bias corrected MLE)			0.299
784					Theta hat (MLE)	78.8			Theta star (bias corrected MLE)			79.72
785					nu hat (MLE)	41.77			nu star (bias corrected)			41.29
786					Mean (detects)	23.85						
787												
788	**Gamma ROS Statistics using Imputed Non-Detects**											
789	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
790	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
791	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
792	This is especially true when the sample size is small.											
793	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
794					Minimum	0.01			Mean			18.97
795					Maximum	549.5			Median			0.89
796					SD	71.51			CV			3.769
797					k hat (MLE)	0.223			k star (bias corrected MLE)			0.223
798					Theta hat (MLE)	84.9			Theta star (bias corrected MLE)			84.91
799					nu hat (MLE)	44.69			nu star (bias corrected)			44.68
800					Adjusted Level of Significance (β)	0.0476						
801					Approximate Chi Square Value (44.68, α)	30.35			Adjusted Chi Square Value (44.68, β)			30.18
802					95% Gamma Approximate UCL (use when n>=50)	27.93			95% Gamma Adjusted UCL (use when n<50)			28.09
803												
804	**Estimates of Gamma Parameters using KM Estimates**											
805					Mean (KM)	17.18			SD (KM)			70.53
806					Variance (KM)	4974			SE of Mean (KM)			7.107
807					k hat (KM)	0.0593			k star (KM)			0.0642
808					nu hat (KM)	11.87			nu star (KM)			12.84
809					theta hat (KM)	289.5			theta star (KM)			267.5
810					80% gamma percentile (KM)	4.981			90% gamma percentile (KM)			34.47
811					95% gamma percentile (KM)	97.57			99% gamma percentile (KM)			336.5
812												
813	**Gamma Kaplan-Meier (KM) Statistics**											
814					Approximate Chi Square Value (12.84, α)	5.787			Adjusted Chi Square Value (12.84, β)			5.718
815					95% Gamma Approximate KM-UCL (use when n>=50)	38.12			95% Gamma Adjusted KM-UCL (use when n<50)			38.58
816												
817	**Lognormal GOF Test on Detected Observations Only**											
818					Shapiro Wilk Approximate Test Statistic	0.917			**Shapiro Wilk GOF Test**			
819					5% Shapiro Wilk P Value	1.1073E-4			Detected Data Not Lognormal at 5% Significance Level			
820					Lilliefors Test Statistic	0.117			**Lilliefors GOF Test**			
821					5% Lilliefors Critical Value	0.107			Detected Data Not Lognormal at 5% Significance Level			
822	**Detected Data Not Lognormal at 5% Significance Level**											
823												
824	**Lognormal ROS Statistics Using Imputed Non-Detects**											
825					Mean in Original Scale	17.27			Mean in Log Scale			0.612
826					SD in Original Scale	70.87			SD in Log Scale			1.78
827					95% t UCL (assumes normality of ROS data)	29.04			95% Percentile Bootstrap UCL			30.06
828					95% BCA Bootstrap UCL	36.21			95% Bootstrap t UCL			42.12
829					95% H-UCL (Log ROS)	15.77						
830												
831	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
832					KM Mean (logged)	0.597			KM Geo Mean			1.816

833					KM SD (logged)	1.741				95% Critical H Value (KM-Log)		3.093
834					KM Standard Error of Mean (logged)	0.19				95% H-UCL (KM -Log)		14.21
835					KM SD (logged)	1.741				95% Critical H Value (KM-Log)		3.093
836					KM Standard Error of Mean (logged)	0.19						
837												
838	**DL/2 Statistics**											
839	**DL/2 Normal**						**DL/2 Log-Transformed**					
840					Mean in Original Scale	21.51				Mean in Log Scale		1.187
841					SD in Original Scale	70.53				SD in Log Scale		1.908
842					95% t UCL (Assumes normality)	33.22				95% H-Stat UCL		38.12
843	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
844												
845	**Nonparametric Distribution Free UCL Statistics**											
846	**Data do not follow a Discernible Distribution at 5% Significance Level**											
847												
848	**Suggested UCL to Use**											
849					95% KM (Chebyshev) UCL	48.16						
850												
851	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
852	Recommendations are based upon data size, data distribution, and skewness.											
853	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
854	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
855												
856	**Val_IRON**											
857												
858	**General Statistics**											
859					Total Number of Observations	100				Number of Distinct Observations		92
860					Number of Detects	97				Number of Non-Detects		3
861					Number of Distinct Detects	91				Number of Distinct Non-Detects		1
862					Minimum Detect	40.1				Minimum Non-Detect		200
863					Maximum Detect	74100				Maximum Non-Detect		200
864					Variance Detects	1.783E+8				Percent Non-Detects		3%
865					Mean Detects	14952				SD Detects		13352
866					Median Detects	11600				CV Detects		0.893
867					Skewness Detects	1.884				Kurtosis Detects		4.878
868					Mean of Logged Detects	9.114				SD of Logged Detects		1.268
869												
870	**Normal GOF Test on Detects Only**											
871					Shapiro Wilk Test Statistic	0.837	**Normal GOF Test on Detected Observations Only**					
872					5% Shapiro Wilk P Value	7.772E-16	Detected Data Not Normal at 5% Significance Level					
873					Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**					
874					5% Lilliefors Critical Value	0.0902	Detected Data Not Normal at 5% Significance Level					
875	**Detected Data Not Normal at 5% Significance Level**											
876												
877	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
878					KM Mean	14507				KM Standard Error of Mean		1339
879					KM SD	13326				95% KM (BCA) UCL		16846
880					95% KM (t) UCL	16731				95% KM (Percentile Bootstrap) UCL		16642
881					95% KM (z) UCL	16710				95% KM Bootstrap t UCL		17022
882					90% KM Chebyshev UCL	18525				95% KM Chebyshev UCL		20345
883					97.5% KM Chebyshev UCL	22872				99% KM Chebyshev UCL		27834
884												

	A	B	C	D	E	F	G	H	I	J	K	L
885	**Gamma GOF Tests on Detected Observations Only**											
886					A-D Test Statistic	0.594	**Anderson-Darling GOF Test**					
887					5% A-D Critical Value	0.779	Detected data appear Gamma Distributed at 5% Significance Level					
888					K-S Test Statistic	0.0757	**Kolmogorov-Smirnov GOF**					
889					5% K-S Critical Value	0.0933	Detected data appear Gamma Distributed at 5% Significance Level					
890	**Detected data appear Gamma Distributed at 5% Significance Level**											
891												
892	**Gamma Statistics on Detected Data Only**											
893					k hat (MLE)	1.14				k star (bias corrected MLE)		1.111
894					Theta hat (MLE)	13121				Theta star (bias corrected MLE)		13456
895					nu hat (MLE)	221.1				nu star (bias corrected)		215.6
896					Mean (detects)	14952						
897												
898	**Gamma ROS Statistics using Imputed Non-Detects**											
899	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
900	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
901	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
902	This is especially true when the sample size is small.											
903	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
904					Minimum	0.01				Mean		14511
905					Maximum	74100				Median		11100
906					SD	13388				CV		0.923
907					k hat (MLE)	0.873				k star (bias corrected MLE)		0.853
908					Theta hat (MLE)	16628				Theta star (bias corrected MLE)		17008
909					nu hat (MLE)	174.5				nu star (bias corrected)		170.6
910					Adjusted Level of Significance (β)	0.0476						
911					Approximate Chi Square Value (170.64, α)	141.4				Adjusted Chi Square Value (170.64, β)		141
912					95% Gamma Approximate UCL (use when n>=50)	17508				95% Gamma Adjusted UCL (use when n<50)		17556
913												
914	**Estimates of Gamma Parameters using KM Estimates**											
915					Mean (KM)	14507				SD (KM)		13326
916					Variance (KM)	1.776E+8				SE of Mean (KM)		1339
917					k hat (KM)	1.185				k star (KM)		1.156
918					nu hat (KM)	237				nu star (KM)		231.2
919					theta hat (KM)	12241				theta star (KM)		12547
920					80% gamma percentile (KM)	23052				90% gamma percentile (KM)		32227
921					95% gamma percentile (KM)	41301				99% gamma percentile (KM)		62153
922												
923	**Gamma Kaplan-Meier (KM) Statistics**											
924					Approximate Chi Square Value (231.24, α)	197				Adjusted Chi Square Value (231.24, β)		196.6
925					95% Gamma Approximate KM-UCL (use when n>=50)	17025				95% Gamma Adjusted KM-UCL (use when n<50)		17064
926												
927	**Lognormal GOF Test on Detected Observations Only**											
928					Shapiro Wilk Approximate Test Statistic	0.88	**Shapiro Wilk GOF Test**					
929					5% Shapiro Wilk P Value	8.155E-11	Detected Data Not Lognormal at 5% Significance Level					
930					Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**					
931					5% Lilliefors Critical Value	0.0902	Detected Data Not Lognormal at 5% Significance Level					
932	**Detected Data Not Lognormal at 5% Significance Level**											
933												
934	**Lognormal ROS Statistics Using Imputed Non-Detects**											
935					Mean in Original Scale	14524				Mean in Log Scale		9.035
936					SD in Original Scale	13374				SD in Log Scale		1.328

937	95% t UCL (assumes normality of ROS data)					16745	95% Percentile Bootstrap UCL					16675
938	95% BCA Bootstrap UCL					16944	95% Bootstrap t UCL					17140
939	95% H-UCL (Log ROS)					28670						
940												
941	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
942	KM Mean (logged)					8.97	KM Geo Mean					7864
943	KM SD (logged)					1.491	95% Critical H Value (KM-Log)					2.79
944	KM Standard Error of Mean (logged)					0.151	95% H-UCL (KM -Log)					36284
945	KM SD (logged)					1.491	95% Critical H Value (KM-Log)					2.79
946	KM Standard Error of Mean (logged)					0.151						
947												
948	**DL/2 Statistics**											
949	**DL/2 Normal**						**DL/2 Log-Transformed**					
950	Mean in Original Scale					14507	Mean in Log Scale					8.978
951	SD in Original Scale					13393	SD in Log Scale					1.469
952	95% t UCL (Assumes normality)					16731	95% H-Stat UCL					35065
953	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
954												
955	**Nonparametric Distribution Free UCL Statistics**											
956	**Detected Data appear Gamma Distributed at 5% Significance Level**											
957												
958	**Suggested UCL to Use**											
959	95% KM Approximate Gamma UCL					17025	95% GROS Approximate Gamma UCL					17508
960												
961	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
962	Recommendations are based upon data size, data distribution, and skewness.											
963	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
964	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
965												
966	**Val_LEAD**											
967												
968	**General Statistics**											
969	Total Number of Observations					100	Number of Distinct Observations					39
970	Number of Detects					47	Number of Non-Detects					53
971	Number of Distinct Detects					38	Number of Distinct Non-Detects					2
972	Minimum Detect					0.1	Minimum Non-Detect					1
973	Maximum Detect					47	Maximum Non-Detect					10
974	Variance Detects					67.52	Percent Non-Detects					53%
975	Mean Detects					5.944	SD Detects					8.217
976	Median Detects					3.9	CV Detects					1.382
977	Skewness Detects					3.42	Kurtosis Detects					13.93
978	Mean of Logged Detects					1.069	SD of Logged Detects					1.398
979												
980	**Normal GOF Test on Detects Only**											
981	Shapiro Wilk Test Statistic					0.614	**Shapiro Wilk GOF Test**					
982	5% Shapiro Wilk Critical Value					0.946	Detected Data Not Normal at 5% Significance Level					
983	Lilliefors Test Statistic					0.276	**Lilliefors GOF Test**					
984	5% Lilliefors Critical Value					0.128	Detected Data Not Normal at 5% Significance Level					
985	**Detected Data Not Normal at 5% Significance Level**											
986												
987	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
988	KM Mean					3.029	KM Standard Error of Mean					0.638

	A	B	C	D	E	F	G	H	I	J	K	L
989					KM SD	6.27				95% KM (BCA) UCL		4.162
990					95% KM (t) UCL	4.089				95% KM (Percentile Bootstrap) UCL		4.142
991					95% KM (z) UCL	4.079				95% KM Bootstrap t UCL		4.573
992					90% KM Chebyshev UCL	4.945				95% KM Chebyshev UCL		5.812
993					97.5% KM Chebyshev UCL	7.017				99% KM Chebyshev UCL		9.382
994												
995					**Gamma GOF Tests on Detected Observations Only**							
996					A-D Test Statistic	1.029	**Anderson-Darling GOF Test**					
997					5% A-D Critical Value	0.787	Detected Data Not Gamma Distributed at 5% Significance Level					
998					K-S Test Statistic	0.137	**Kolmogorov-Smirnov GOF**					
999					5% K-S Critical Value	0.134	Detected Data Not Gamma Distributed at 5% Significance Level					
1000					**Detected Data Not Gamma Distributed at 5% Significance Level**							
1001												
1002					**Gamma Statistics on Detected Data Only**							
1003					k hat (MLE)	0.829	k star (bias corrected MLE)					0.79
1004					Theta hat (MLE)	7.173	Theta star (bias corrected MLE)					7.524
1005					nu hat (MLE)	77.9	nu star (bias corrected)					74.26
1006					Mean (detects)	5.944						
1007												
1008					**Gamma ROS Statistics using Imputed Non-Detects**							
1009					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1010					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1011					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1012					This is especially true when the sample size is small.							
1013					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1014					Minimum	0.01	Mean					2.947
1015					Maximum	47	Median					0.105
1016					SD	6.347	CV					2.153
1017					k hat (MLE)	0.253	k star (bias corrected MLE)					0.252
1018					Theta hat (MLE)	11.66	Theta star (bias corrected MLE)					11.7
1019					nu hat (MLE)	50.56	nu star (bias corrected)					50.37
1020					Adjusted Level of Significance (β)	0.0476						
1021					Approximate Chi Square Value (50.37, α)	35.08	Adjusted Chi Square Value (50.37, β)					34.89
1022					95% Gamma Approximate UCL (use when n>=50)	4.233	95% Gamma Adjusted UCL (use when n<50)					4.256
1023												
1024					**Estimates of Gamma Parameters using KM Estimates**							
1025					Mean (KM)	3.029	SD (KM)					6.27
1026					Variance (KM)	39.31	SE of Mean (KM)					0.638
1027					k hat (KM)	0.233	k star (KM)					0.233
1028					nu hat (KM)	46.68	nu star (KM)					46.61
1029					theta hat (KM)	12.98	theta star (KM)					13
1030					80% gamma percentile (KM)	4.284	90% gamma percentile (KM)					9.13
1031					95% gamma percentile (KM)	14.97	99% gamma percentile (KM)					30.66
1032												
1033					**Gamma Kaplan-Meier (KM) Statistics**							
1034					Approximate Chi Square Value (46.61, α)	31.95	Adjusted Chi Square Value (46.61, β)					31.77
1035					95% Gamma Approximate KM-UCL (use when n>=50)	4.42	95% Gamma Adjusted KM-UCL (use when n<50)					4.444
1036												
1037					**Lognormal GOF Test on Detected Observations Only**							
1038					Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**					
1039					5% Shapiro Wilk Critical Value	0.946	Detected Data Not Lognormal at 5% Significance Level					
1040					Lilliefors Test Statistic	0.152	**Lilliefors GOF Test**					

1041	5% Lilliefors Critical Value					0.128	Detected Data Not Lognormal at 5% Significance Level					
1042	**Detected Data Not Lognormal at 5% Significance Level**											
1043												
1044	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1045	Mean in Original Scale					3.092	Mean in Log Scale					-0.138
1046	SD in Original Scale					6.249	SD in Log Scale					1.711
1047	95% t UCL (assumes normality of ROS data)					4.13	95% Percentile Bootstrap UCL					4.201
1048	95% BCA Bootstrap UCL					4.388	95% Bootstrap t UCL					4.675
1049	95% H-UCL (Log ROS)					6.367						
1050												
1051	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1052	KM Mean (logged)					-0.386	KM Geo Mean					0.68
1053	KM SD (logged)					1.792	95% Critical H Value (KM-Log)					3.157
1054	KM Standard Error of Mean (logged)					0.205	95% H-UCL (KM -Log)					5.985
1055	KM SD (logged)					1.792	95% Critical H Value (KM-Log)					3.157
1056	KM Standard Error of Mean (logged)					0.205						
1057												
1058	**DL/2 Statistics**											
1059	**DL/2 Normal**						**DL/2 Log-Transformed**					
1060	Mean in Original Scale					3.464	Mean in Log Scale					0.343
1061	SD in Original Scale					6.198	SD in Log Scale					1.335
1062	95% t UCL (Assumes normality)					4.493	95% H-Stat UCL					4.874
1063	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1064												
1065	**Nonparametric Distribution Free UCL Statistics**											
1066	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1067												
1068	**Suggested UCL to Use**											
1069	95% KM (Chebyshev) UCL					5.812						
1070												
1071	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1072	Recommendations are based upon data size, data distribution, and skewness.											
1073	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1074	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1075												
1076												
1077	**Val_MANGANESE**											
1078												
1079	**General Statistics**											
1080	Total Number of Observations					100	Number of Distinct Observations					91
1081							Number of Missing Observations					0
1082	Minimum					25.9	Mean					333.9
1083	Maximum					1510	Median					263
1084	SD					295.8	Std. Error of Mean					29.58
1085	Coefficient of Variation					0.886	Skewness					1.339
1086												
1087	**Normal GOF Test**											
1088	Shapiro Wilk Test Statistic					0.867	**Shapiro Wilk GOF Test**					
1089	5% Shapiro Wilk P Value					7.992E-13	Data Not Normal at 5% Significance Level					
1090	Lilliefors Test Statistic					0.149	**Lilliefors GOF Test**					
1091	5% Lilliefors Critical Value					0.0889	Data Not Normal at 5% Significance Level					
1092	**Data Not Normal at 5% Significance Level**											

1093												
1094	**Assuming Normal Distribution**											
1095	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
1096	95% Student's-t UCL				383		95% Adjusted-CLT UCL (Chen-1995)				386.8	
1097							95% Modified-t UCL (Johnson-1978)				383.7	
1098												
1099	**Gamma GOF Test**											
1100	A-D Test Statistic				0.551		**Anderson-Darling Gamma GOF Test**					
1101	5% A-D Critical Value				0.777		Detected data appear Gamma Distributed at 5% Significance Level					
1102	K-S Test Statistic				0.0765		**Kolmogorov-Smirnov Gamma GOF Test**					
1103	5% K-S Critical Value				0.0917		Detected data appear Gamma Distributed at 5% Significance Level					
1104	**Detected data appear Gamma Distributed at 5% Significance Level**											
1105												
1106	**Gamma Statistics**											
1107	k hat (MLE)				1.233		k star (bias corrected MLE)				1.203	
1108	Theta hat (MLE)				270.7		Theta star (bias corrected MLE)				277.5	
1109	nu hat (MLE)				246.7		nu star (bias corrected)				240.6	
1110	MLE Mean (bias corrected)				333.9		MLE Sd (bias corrected)				304.4	
1111							Approximate Chi Square Value (0.05)				205.7	
1112	Adjusted Level of Significance				0.0476		Adjusted Chi Square Value				205.2	
1113												
1114	**Assuming Gamma Distribution**											
1115	95% Approximate Gamma UCL (use when n>=50)				390.6		95% Adjusted Gamma UCL (use when n<50)				391.5	
1116												
1117	**Lognormal GOF Test**											
1118	Shapiro Wilk Test Statistic				0.938		**Shapiro Wilk Lognormal GOF Test**					
1119	5% Shapiro Wilk P Value				1.7056E-4		Data Not Lognormal at 5% Significance Level					
1120	Lilliefors Test Statistic				0.111		**Lilliefors Lognormal GOF Test**					
1121	5% Lilliefors Critical Value				0.0889		Data Not Lognormal at 5% Significance Level					
1122	**Data Not Lognormal at 5% Significance Level**											
1123												
1124	**Lognormal Statistics**											
1125	Minimum of Logged Data				3.254		Mean of logged Data				5.354	
1126	Maximum of Logged Data				7.32		SD of logged Data				1.057	
1127												
1128	**Assuming Lognormal Distribution**											
1129	95% H-UCL				472.3		90% Chebyshev (MVUE) UCL				507.9	
1130	95% Chebyshev (MVUE) UCL				572		97.5% Chebyshev (MVUE) UCL				661	
1131	99% Chebyshev (MVUE) UCL				835.8							
1132												
1133	**Nonparametric Distribution Free UCL Statistics**											
1134	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1135												
1136	**Nonparametric Distribution Free UCLs**											
1137	95% CLT UCL				382.6		95% Jackknife UCL				383	
1138	95% Standard Bootstrap UCL				382.7		95% Bootstrap-t UCL				386.8	
1139	95% Hall's Bootstrap UCL				386.6		95% Percentile Bootstrap UCL				382.6	
1140	95% BCA Bootstrap UCL				388.5							
1141	90% Chebyshev(Mean, Sd) UCL				422.7		95% Chebyshev(Mean, Sd) UCL				462.9	
1142	97.5% Chebyshev(Mean, Sd) UCL				518.7		99% Chebyshev(Mean, Sd) UCL				628.3	
1143												
1144	**Suggested UCL to Use**											

1145					95% Approximate Gamma UCL	390.6						
1146												
1147	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1148	Recommendations are based upon data size, data distribution, and skewness.											
1149	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1150	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1151												
1152	**Val_NICKEL**											
1153												
1154	**General Statistics**											
1155					Total Number of Observations	100			Number of Distinct Observations	72		
1156					Number of Detects	85			Number of Non-Detects	15		
1157					Number of Distinct Detects	71			Number of Distinct Non-Detects	2		
1158					Minimum Detect	0.36			Minimum Non-Detect	1		
1159					Maximum Detect	210			Maximum Non-Detect	40		
1160					Variance Detects	883.3			Percent Non-Detects	15%		
1161					Mean Detects	16.13			SD Detects	29.72		
1162					Median Detects	6.2			CV Detects	1.842		
1163					Skewness Detects	4.261			Kurtosis Detects	22.73		
1164					Mean of Logged Detects	1.858			SD of Logged Detects	1.35		
1165												
1166	**Normal GOF Test on Detects Only**											
1167					Shapiro Wilk Test Statistic	0.535			**Normal GOF Test on Detected Observations Only**			
1168					5% Shapiro Wilk P Value	0			Detected Data Not Normal at 5% Significance Level			
1169					Lilliefors Test Statistic	0.298			**Lilliefors GOF Test**			
1170					5% Lilliefors Critical Value	0.0962			Detected Data Not Normal at 5% Significance Level			
1171	**Detected Data Not Normal at 5% Significance Level**											
1172												
1173	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1174					KM Mean	14.73			KM Standard Error of Mean	2.802		
1175					KM SD	27.65			95% KM (BCA) UCL	19.6		
1176					95% KM (t) UCL	19.38			95% KM (Percentile Bootstrap) UCL	19.57		
1177					95% KM (z) UCL	19.34			95% KM Bootstrap t UCL	21.75		
1178					90% KM Chebyshev UCL	23.13			95% KM Chebyshev UCL	26.94		
1179					97.5% KM Chebyshev UCL	32.22			99% KM Chebyshev UCL	42.6		
1180												
1181	**Gamma GOF Tests on Detected Observations Only**											
1182					A-D Test Statistic	2.501			**Anderson-Darling GOF Test**			
1183					5% A-D Critical Value	0.802			Detected Data Not Gamma Distributed at 5% Significance Level			
1184					K-S Test Statistic	0.149			**Kolmogorov-Smirnov GOF**			
1185					5% K-S Critical Value	0.101			Detected Data Not Gamma Distributed at 5% Significance Level			
1186	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1187												
1188	**Gamma Statistics on Detected Data Only**											
1189					k hat (MLE)	0.66			k star (bias corrected MLE)	0.645		
1190					Theta hat (MLE)	24.44			Theta star (bias corrected MLE)	25.03		
1191					nu hat (MLE)	112.2			nu star (bias corrected)	109.6		
1192					Mean (detects)	16.13						
1193												
1194	**Gamma ROS Statistics using Imputed Non-Detects**											
1195	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1196	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											

1197	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1198	This is especially true when the sample size is small.											
1199	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1200					Minimum	0.01			Mean			14.83
1201					Maximum	210			Median			5.75
1202					SD	27.91			CV			1.881
1203					k hat (MLE)	0.484			k star (bias corrected MLE)			0.476
1204					Theta hat (MLE)	30.64			Theta star (bias corrected MLE)			31.15
1205					nu hat (MLE)	96.82			nu star (bias corrected)			95.25
1206					Adjusted Level of Significance (β)	0.0476						
1207					Approximate Chi Square Value (95.25, α)	73.74			Adjusted Chi Square Value (95.25, β)			73.46
1208					95% Gamma Approximate UCL (use when n>=50)	19.16			95% Gamma Adjusted UCL (use when n<50)			19.23
1209												
1210	**Estimates of Gamma Parameters using KM Estimates**											
1211					Mean (KM)	14.73			SD (KM)			27.65
1212					Variance (KM)	764.4			SE of Mean (KM)			2.802
1213					k hat (KM)	0.284			k star (KM)			0.282
1214					nu hat (KM)	56.75			nu star (KM)			56.38
1215					theta hat (KM)	51.9			theta star (KM)			52.24
1216					80% gamma percentile (KM)	22.22			90% gamma percentile (KM)			43.74
1217					95% gamma percentile (KM)	68.71			99% gamma percentile (KM)			134.1
1218												
1219	**Gamma Kaplan-Meier (KM) Statistics**											
1220					Approximate Chi Square Value (56.38, α)	40.12			Adjusted Chi Square Value (56.38, β)			39.92
1221					95% Gamma Approximate KM-UCL (use when n>=50)	20.69			95% Gamma Adjusted KM-UCL (use when n<50)			20.8
1222												
1223	**Lognormal GOF Test on Detected Observations Only**											
1224					Shapiro Wilk Approximate Test Statistic	0.983			**Shapiro Wilk GOF Test**			
1225					5% Shapiro Wilk P Value	0.721			Detected Data appear Lognormal at 5% Significance Level			
1226					Lilliefors Test Statistic	0.0511			**Lilliefors GOF Test**			
1227					5% Lilliefors Critical Value	0.0962			Detected Data appear Lognormal at 5% Significance Level			
1228	**Detected Data appear Lognormal at 5% Significance Level**											
1229												
1230	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1231					Mean in Original Scale	14.63			Mean in Log Scale			1.746
1232					SD in Original Scale	27.74			SD in Log Scale			1.366
1233					95% t UCL (assumes normality of ROS data)	19.24			95% Percentile Bootstrap UCL			19.2
1234					95% BCA Bootstrap UCL	21.52			95% Bootstrap t UCL			22.35
1235					95% H-UCL (Log ROS)	20.93						
1236												
1237	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1238					KM Mean (logged)	1.745			KM Geo Mean			5.727
1239					KM SD (logged)	1.369			95% Critical H Value (KM-Log)			2.649
1240					KM Standard Error of Mean (logged)	0.145			95% H-UCL (KM -Log)			21.05
1241					KM SD (logged)	1.369			95% Critical H Value (KM-Log)			2.649
1242					KM Standard Error of Mean (logged)	0.145						
1243												
1244	**DL/2 Statistics**											
1245	**DL/2 Normal**								**DL/2 Log-Transformed**			
1246					Mean in Original Scale	16.13			Mean in Log Scale			1.918
1247					SD in Original Scale	27.54			SD in Log Scale			1.378
1248					95% t UCL (Assumes normality)	20.7			95% H-Stat UCL			25.4

	A	B	C	D	E	F	G	H	I	J	K	L
1249	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1250												
1251	**Nonparametric Distribution Free UCL Statistics**											
1252	**Detected Data appear Lognormal Distributed at 5% Significance Level**											
1253												
1254	**Suggested UCL to Use**											
1255					KM H-UCL	21.05						
1256												
1257	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1258	Recommendations are based upon data size, data distribution, and skewness.											
1259	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1260	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1261												
1262	**Val_SELENIUM**											
1263												
1264	**General Statistics**											
1265					Total Number of Observations	100			Number of Distinct Observations			31
1266					Number of Detects	35			Number of Non-Detects			65
1267					Number of Distinct Detects	27			Number of Distinct Non-Detects			5
1268					Minimum Detect	1			Minimum Non-Detect			1
1269					Maximum Detect	49.1			Maximum Non-Detect			35
1270					Variance Detects	151.9			Percent Non-Detects			65%
1271					Mean Detects	8.729			SD Detects			12.32
1272					Median Detects	3.2			CV Detects			1.412
1273					Skewness Detects	2.065			Kurtosis Detects			3.589
1274					Mean of Logged Detects	1.455			SD of Logged Detects			1.118
1275												
1276	**Normal GOF Test on Detects Only**											
1277					Shapiro Wilk Test Statistic	0.644			**Shapiro Wilk GOF Test**			
1278					5% Shapiro Wilk Critical Value	0.934			Detected Data Not Normal at 5% Significance Level			
1279					Lilliefors Test Statistic	0.346			**Lilliefors GOF Test**			
1280					5% Lilliefors Critical Value	0.148			Detected Data Not Normal at 5% Significance Level			
1281	**Detected Data Not Normal at 5% Significance Level**											
1282												
1283	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1284					KM Mean	4.597			KM Standard Error of Mean			0.891
1285					KM SD	8.234			95% KM (BCA) UCL			6.102
1286					95% KM (t) UCL	6.076			95% KM (Percentile Bootstrap) UCL			6.199
1287					95% KM (z) UCL	6.062			95% KM Bootstrap t UCL			6.582
1288					90% KM Chebyshev UCL	7.27			95% KM Chebyshev UCL			8.48
1289					97.5% KM Chebyshev UCL	10.16			99% KM Chebyshev UCL			13.46
1290												
1291	**Gamma GOF Tests on Detected Observations Only**											
1292					A-D Test Statistic	2.914			**Anderson-Darling GOF Test**			
1293					5% A-D Critical Value	0.784			Detected Data Not Gamma Distributed at 5% Significance Level			
1294					K-S Test Statistic	0.262			**Kolmogorov-Smirnov GOF**			
1295					5% K-S Critical Value	0.154			Detected Data Not Gamma Distributed at 5% Significance Level			
1296	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1297												
1298	**Gamma Statistics on Detected Data Only**											
1299					k hat (MLE)	0.83			k star (bias corrected MLE)			0.778
1300					Theta hat (MLE)	10.51			Theta star (bias corrected MLE)			11.22

	A	B	C	D	E	F	G	H	I	J	K	L
1301					nu hat (MLE)	58.13				nu star (bias corrected)		54.48
1302					Mean (detects)	8.729						
1303												
1304	**Gamma ROS Statistics using Imputed Non-Detects**											
1305	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1306	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1307	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1308	This is especially true when the sample size is small.											
1309	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1310					Minimum	0.01				Mean		4.407
1311					Maximum	49.1				Median		1.435
1312					SD	8.559				CV		1.942
1313					k hat (MLE)	0.265				k star (bias corrected MLE)		0.264
1314					Theta hat (MLE)	16.6				Theta star (bias corrected MLE)		16.68
1315					nu hat (MLE)	53.1				nu star (bias corrected)		52.84
1316					Adjusted Level of Significance (β)	0.0476						
1317					Approximate Chi Square Value (52.84, α)	37.14				Adjusted Chi Square Value (52.84, β)		36.95
1318					95% Gamma Approximate UCL (use when n>=50)	6.269				95% Gamma Adjusted UCL (use when n<50)		6.302
1319												
1320	**Estimates of Gamma Parameters using KM Estimates**											
1321					Mean (KM)	4.597				SD (KM)		8.234
1322					Variance (KM)	67.8				SE of Mean (KM)		0.891
1323					k hat (KM)	0.312				k star (KM)		0.309
1324					nu hat (KM)	62.32				nu star (KM)		61.79
1325					theta hat (KM)	14.75				theta star (KM)		14.88
1326					80% gamma percentile (KM)	7.099				90% gamma percentile (KM)		13.51
1327					95% gamma percentile (KM)	20.83				99% gamma percentile (KM)		39.79
1328												
1329	**Gamma Kaplan-Meier (KM) Statistics**											
1330					Approximate Chi Square Value (61.79, α)	44.71				Adjusted Chi Square Value (61.79, β)		44.49
1331					95% Gamma Approximate KM-UCL (use when n>=50)	6.353				95% Gamma Adjusted KM-UCL (use when n<50)		6.383
1332												
1333	**Lognormal GOF Test on Detected Observations Only**											
1334					Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**					
1335					5% Shapiro Wilk Critical Value	0.934	Detected Data Not Lognormal at 5% Significance Level					
1336					Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**					
1337					5% Lilliefors Critical Value	0.148	Detected Data Not Lognormal at 5% Significance Level					
1338	**Detected Data Not Lognormal at 5% Significance Level**											
1339												
1340	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1341					Mean in Original Scale	4.379				Mean in Log Scale		0.567
1342					SD in Original Scale	8.16				SD in Log Scale		1.311
1343					95% t UCL (assumes normality of ROS data)	5.734				95% Percentile Bootstrap UCL		5.784
1344					95% BCA Bootstrap UCL	6.257				95% Bootstrap t UCL		6.327
1345					95% H-UCL (Log ROS)	5.847						
1346												
1347	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1348					KM Mean (logged)	0.851				KM Geo Mean		2.341
1349					KM SD (logged)	0.961				95% Critical H Value (KM-Log)		2.22
1350					KM Standard Error of Mean (logged)	0.12				95% H-UCL (KM -Log)		4.604
1351					KM SD (logged)	0.961				95% Critical H Value (KM-Log)		2.22
1352					KM Standard Error of Mean (logged)	0.12						

1353												
1354	**DL/2 Statistics**											
1355	**DL/2 Normal**						**DL/2 Log-Transformed**					
1356				Mean in Original Scale		8.32				Mean in Log Scale		1.417
1357				SD in Original Scale		9.474				SD in Log Scale		1.269
1358				95% t UCL (Assumes normality)		9.893				95% H-Stat UCL		12.75
1359	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1360												
1361	**Nonparametric Distribution Free UCL Statistics**											
1362	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1363												
1364	**Suggested UCL to Use**											
1365				95% KM (Chebyshev) UCL		8.48						
1366												
1367	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1368	Recommendations are based upon data size, data distribution, and skewness.											
1369	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1370	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1371												
1372	**Val_VANADIUM_FUME_OR_DUST**											
1373												
1374	**General Statistics**											
1375				Total Number of Observations		100				Number of Distinct Observations		40
1376				Number of Detects		41				Number of Non-Detects		59
1377				Number of Distinct Detects		37				Number of Distinct Non-Detects		3
1378				Minimum Detect		0.16				Minimum Non-Detect		2
1379				Maximum Detect		19				Maximum Non-Detect		50
1380				Variance Detects		22.57				Percent Non-Detects		59%
1381				Mean Detects		4.532				SD Detects		4.751
1382				Median Detects		2.6				CV Detects		1.048
1383				Skewness Detects		1.244				Kurtosis Detects		0.934
1384				Mean of Logged Detects		0.811				SD of Logged Detects		1.346
1385												
1386	**Normal GOF Test on Detects Only**											
1387				Shapiro Wilk Test Statistic		0.832	**Shapiro Wilk GOF Test**					
1388				5% Shapiro Wilk Critical Value		0.941	Detected Data Not Normal at 5% Significance Level					
1389				Lilliefors Test Statistic		0.203	**Lilliefors GOF Test**					
1390				5% Lilliefors Critical Value		0.137	Detected Data Not Normal at 5% Significance Level					
1391	**Detected Data Not Normal at 5% Significance Level**											
1392												
1393	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1394				KM Mean		2.822				KM Standard Error of Mean		0.443
1395				KM SD		3.831				95% KM (BCA) UCL		3.633
1396				95% KM (t) UCL		3.558				95% KM (Percentile Bootstrap) UCL		3.579
1397				95% KM (z) UCL		3.551				95% KM Bootstrap t UCL		3.724
1398				90% KM Chebyshev UCL		4.152				95% KM Chebyshev UCL		4.754
1399				97.5% KM Chebyshev UCL		5.59				99% KM Chebyshev UCL		7.233
1400												
1401	**Gamma GOF Tests on Detected Observations Only**											
1402				A-D Test Statistic		0.597	**Anderson-Darling GOF Test**					
1403				5% A-D Critical Value		0.785	Detected data appear Gamma Distributed at 5% Significance Level					
1404				K-S Test Statistic		0.0932	**Kolmogorov-Smirnov GOF**					

	A	B	C	D	E	F	G	H	I	J	K	L
1405					5% K-S Critical Value	0.143	Detected data appear Gamma Distributed at 5% Significance Level					
1406	**Detected data appear Gamma Distributed at 5% Significance Level**											
1407												
1408	**Gamma Statistics on Detected Data Only**											
1409					k hat (MLE)	0.842				k star (bias corrected MLE)		0.797
1410					Theta hat (MLE)	5.383				Theta star (bias corrected MLE)		5.69
1411					nu hat (MLE)	69.04				nu star (bias corrected)		65.32
1412					Mean (detects)	4.532						
1413												
1414	**Gamma ROS Statistics using Imputed Non-Detects**											
1415	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1416	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1417	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1418	This is especially true when the sample size is small.											
1419	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1420					Minimum	0.01				Mean		2.814
1421					Maximum	19				Median		1.388
1422					SD	3.769				CV		1.339
1423					k hat (MLE)	0.444				k star (bias corrected MLE)		0.438
1424					Theta hat (MLE)	6.333				Theta star (bias corrected MLE)		6.43
1425					nu hat (MLE)	88.87				nu star (bias corrected)		87.54
1426					Adjusted Level of Significance (β)	0.0476						
1427					Approximate Chi Square Value (87.54, α)	66.97				Adjusted Chi Square Value (87.54, β)		66.71
1428					95% Gamma Approximate UCL (use when n>=50)	3.679				95% Gamma Adjusted UCL (use when n<50)		3.693
1429												
1430	**Estimates of Gamma Parameters using KM Estimates**											
1431					Mean (KM)	2.822				SD (KM)		3.831
1432					Variance (KM)	14.68				SE of Mean (KM)		0.443
1433					k hat (KM)	0.543				k star (KM)		0.533
1434					nu hat (KM)	108.5				nu star (KM)		106.6
1435					theta hat (KM)	5.201				theta star (KM)		5.294
1436					80% gamma percentile (KM)	4.646				90% gamma percentile (KM)		7.533
1437					95% gamma percentile (KM)	10.6				99% gamma percentile (KM)		18.08
1438												
1439	**Gamma Kaplan-Meier (KM) Statistics**											
1440					Approximate Chi Square Value (106.61, α)	83.78				Adjusted Chi Square Value (106.61, β)		83.49
1441					95% Gamma Approximate KM-UCL (use when n>=50)	3.591				95% Gamma Adjusted KM-UCL (use when n<50)		3.604
1442												
1443	**Lognormal GOF Test on Detected Observations Only**											
1444					Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**					
1445					5% Shapiro Wilk Critical Value	0.941	Detected Data Not Lognormal at 5% Significance Level					
1446					Lilliefors Test Statistic	0.119	**Lilliefors GOF Test**					
1447					5% Lilliefors Critical Value	0.137	Detected Data appear Lognormal at 5% Significance Level					
1448	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
1449												
1450	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1451					Mean in Original Scale	2.769				Mean in Log Scale		0.287
1452					SD in Original Scale	3.679				SD in Log Scale		1.238
1453					95% t UCL (assumes normality of ROS data)	3.379				95% Percentile Bootstrap UCL		3.388
1454					95% BCA Bootstrap UCL	3.531				95% Bootstrap t UCL		3.482
1455					95% H-UCL (Log ROS)	3.918						
1456												

1457	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1458					KM Mean (logged)	0.271				KM Geo Mean	1.311	
1459					KM SD (logged)	1.247				95% Critical H Value (KM-Log)	2.514	
1460					KM Standard Error of Mean (logged)	0.176				95% H-UCL (KM -Log)	3.909	
1461					KM SD (logged)	1.247				95% Critical H Value (KM-Log)	2.514	
1462					KM Standard Error of Mean (logged)	0.176						
1463												
1464	**DL/2 Statistics**											
1465	**DL/2 Normal**						**DL/2 Log-Transformed**					
1466					Mean in Original Scale	7.578				Mean in Log Scale	1.178	
1467					SD in Original Scale	9.351				SD in Log Scale	1.372	
1468					95% t UCL (Assumes normality)	9.131				95% H-Stat UCL	12	
1469	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1470												
1471	**Nonparametric Distribution Free UCL Statistics**											
1472	**Detected Data appear Gamma Distributed at 5% Significance Level**											
1473												
1474	**Suggested UCL to Use**											
1475					95% KM Approximate Gamma UCL	3.591						
1476												
1477	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1478	Recommendations are based upon data size, data distribution, and skewness.											
1479	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1480	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1481												
1482	**UCL Statistics for Data Sets with Non-Detects**											
1483												
1484	User Selected Options											
1485	Date/Time of Computation				ProUCL 5.111/15/2017 6:20:40 PM							
1486	From File				GW528-GW_RA_Formatted_Data.xls							
1487	Full Precision				OFF							
1488	Confidence Coefficient				95%							
1489	Number of Bootstrap Operations				2000							
1490												
1491	**Val_CYANIDE**											
1492												
1493	**General Statistics**											
1494					Total Number of Observations	100				Number of Distinct Observations	17	
1495					Number of Detects	16				Number of Non-Detects	84	
1496					Number of Distinct Detects	16				Number of Distinct Non-Detects	1	
1497					Minimum Detect	0.59				Minimum Non-Detect	10	
1498					Maximum Detect	266.5				Maximum Non-Detect	10	
1499					Variance Detects	4047				Percent Non-Detects	84%	
1500					Mean Detects	36.48				SD Detects	63.61	
1501					Median Detects	18.35				CV Detects	1.744	
1502					Skewness Detects	3.541				Kurtosis Detects	13.37	
1503					Mean of Logged Detects	2.667				SD of Logged Detects	1.559	
1504												
1505	**Normal GOF Test on Detects Only**											
1506					Shapiro Wilk Test Statistic	0.514	**Shapiro Wilk GOF Test**					
1507					5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level					
1508					Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**					

1509	5% Lilliefors Critical Value					0.213	Detected Data Not Normal at 5% Significance Level					
1510	**Detected Data Not Normal at 5% Significance Level**											
1511												
1512	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1513	KM Mean					7.684	KM Standard Error of Mean					2.948
1514	KM SD					27.7	95% KM (BCA) UCL					14.34
1515	95% KM (t) UCL					12.58	95% KM (Percentile Bootstrap) UCL					13.46
1516	95% KM (z) UCL					12.53	95% KM Bootstrap t UCL					20.63
1517	90% KM Chebyshev UCL					16.53	95% KM Chebyshev UCL					20.53
1518	97.5% KM Chebyshev UCL					26.09	99% KM Chebyshev UCL					37.01
1519												
1520	**Gamma GOF Tests on Detected Observations Only**											
1521	A-D Test Statistic					0.464	**Anderson-Darling GOF Test**					
1522	5% A-D Critical Value					0.783	Detected data appear Gamma Distributed at 5% Significance Level					
1523	K-S Test Statistic					0.165	**Kolmogorov-Smirnov GOF**					
1524	5% K-S Critical Value					0.225	Detected data appear Gamma Distributed at 5% Significance Level					
1525	**Detected data appear Gamma Distributed at 5% Significance Level**											
1526												
1527	**Gamma Statistics on Detected Data Only**											
1528	k hat (MLE)					0.656	k star (bias corrected MLE)					0.575
1529	Theta hat (MLE)					55.6	Theta star (bias corrected MLE)					63.47
1530	nu hat (MLE)					20.99	nu star (bias corrected)					18.39
1531	Mean (detects)					36.48						
1532												
1533	**Gamma ROS Statistics using Imputed Non-Detects**											
1534	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1535	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1536	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1537	This is especially true when the sample size is small.											
1538	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1539	Minimum					0.01	Mean					6.853
1540	Maximum					266.5	Median					0.01
1541	SD					28.19	CV					4.114
1542	k hat (MLE)					0.162	k star (bias corrected MLE)					0.164
1543	Theta hat (MLE)					42.38	Theta star (bias corrected MLE)					41.91
1544	nu hat (MLE)					32.34	nu star (bias corrected)					32.71
1545	Adjusted Level of Significance (β)					0.0476						
1546	Approximate Chi Square Value (32.71, α)					20.63	Adjusted Chi Square Value (32.71, β)					20.49
1547	95% Gamma Approximate UCL (use when n>=50)					10.86	95% Gamma Adjusted UCL (use when n<50)					10.94
1548												
1549	**Estimates of Gamma Parameters using KM Estimates**											
1550	Mean (KM)					7.684	SD (KM)					27.7
1551	Variance (KM)					767.1	SE of Mean (KM)					2.948
1552	k hat (KM)					0.077	k star (KM)					0.0813
1553	nu hat (KM)					15.39	nu star (KM)					16.27
1554	theta hat (KM)					99.83	theta star (KM)					94.48
1555	80% gamma percentile (KM)					3.775	90% gamma percentile (KM)					18.41
1556	95% gamma percentile (KM)					44.71	99% gamma percentile (KM)					135
1557												
1558	**Gamma Kaplan-Meier (KM) Statistics**											
1559	Approximate Chi Square Value (16.27, α)					8.15	Adjusted Chi Square Value (16.27, β)					8.066
1560	95% Gamma Approximate KM-UCL (use when n>=50)					15.34	95% Gamma Adjusted KM-UCL (use when n<50)					15.5

	A	B	C	D	E	F	G	H	I	J	K	L
1561												
1562	**Lognormal GOF Test on Detected Observations Only**											
1563					Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**					
1564					5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level					
1565					Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**					
1566					5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level					
1567	**Detected Data appear Lognormal at 5% Significance Level**											
1568												
1569	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1570					Mean in Original Scale	8.164			Mean in Log Scale			0.685
1571					SD in Original Scale	27.85			SD in Log Scale			1.628
1572					95% t UCL (assumes normality of ROS data)	12.79			95% Percentile Bootstrap UCL			13.36
1573					95% BCA Bootstrap UCL	17.04			95% Bootstrap t UCL			21.56
1574					95% H-UCL (Log ROS)	12.11						
1575												
1576	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1577					KM Mean (logged)	0.831			KM Geo Mean			2.295
1578					KM SD (logged)	1.249			95% Critical H Value (KM-Log)			2.516
1579					KM Standard Error of Mean (logged)	0.382			95% H-UCL (KM -Log)			6.861
1580					KM SD (logged)	1.249			95% Critical H Value (KM-Log)			2.516
1581					KM Standard Error of Mean (logged)	0.382						
1582												
1583	**DL/2 Statistics**											
1584	**DL/2 Normal**						**DL/2 Log-Transformed**					
1585					Mean in Original Scale	10.04			Mean in Log Scale			1.779
1586					SD in Original Scale	27.34			SD in Log Scale			0.721
1587					95% t UCL (Assumes normality)	14.58			95% H-Stat UCL			8.908
1588	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1589												
1590	**Nonparametric Distribution Free UCL Statistics**											
1591	**Detected Data appear Gamma Distributed at 5% Significance Level**											
1592												
1593	**Suggested UCL to Use**											
1594					95% KM Approximate Gamma UCL	15.34						
1595												
1596	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1597	Recommendations are based upon data size, data distribution, and skewness.											
1598	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1599	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1600												
1601	**Val_MERCURY**											
1602												
1603	**General Statistics**											
1604					Total Number of Observations	100			Number of Distinct Observations			25
1605					Number of Detects	27			Number of Non-Detects			73
1606					Number of Distinct Detects	24			Number of Distinct Non-Detects			1
1607					Minimum Detect	0.046			Minimum Non-Detect			0.2
1608					Maximum Detect	1.1			Maximum Non-Detect			0.2
1609					Variance Detects	0.0737			Percent Non-Detects			73%
1610					Mean Detects	0.278			SD Detects			0.272
1611					Median Detects	0.21			CV Detects			0.978
1612					Skewness Detects	1.905			Kurtosis Detects			3.789

	A	B	C	D	E	F	G	H	I	J	K	L
1613					Mean of Logged Detects	-1.68					SD of Logged Detects	0.909
1614												
1615					**Normal GOF Test on Detects Only**							
1616					Shapiro Wilk Test Statistic	0.764	**Shapiro Wilk GOF Test**					
1617					5% Shapiro Wilk Critical Value	0.923	Detected Data Not Normal at 5% Significance Level					
1618					Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**					
1619					5% Lilliefors Critical Value	0.167	Detected Data Not Normal at 5% Significance Level					
1620					**Detected Data Not Normal at 5% Significance Level**							
1621												
1622					**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**							
1623					KM Mean	0.138	KM Standard Error of Mean					0.0179
1624					KM SD	0.164	95% KM (BCA) UCL					0.169
1625					95% KM (t) UCL	0.168	95% KM (Percentile Bootstrap) UCL					0.168
1626					95% KM (z) UCL	0.167	95% KM Bootstrap t UCL					0.177
1627					90% KM Chebyshev UCL	0.192	95% KM Chebyshev UCL					0.216
1628					97.5% KM Chebyshev UCL	0.25	99% KM Chebyshev UCL					0.316
1629												
1630					**Gamma GOF Tests on Detected Observations Only**							
1631					A-D Test Statistic	0.75	**Anderson-Darling GOF Test**					
1632					5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level					
1633					K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**					
1634					5% K-S Critical Value	0.172	Detected Data Not Gamma Distributed at 5% Significance Level					
1635					**Detected data follow Appr. Gamma Distribution at 5% Significance Level**							
1636												
1637					**Gamma Statistics on Detected Data Only**							
1638					k hat (MLE)	1.398	k star (bias corrected MLE)					1.267
1639					Theta hat (MLE)	0.199	Theta star (bias corrected MLE)					0.219
1640					nu hat (MLE)	75.48	nu star (bias corrected)					68.42
1641					Mean (detects)	0.278						
1642												
1643					**Gamma ROS Statistics using Imputed Non-Detects**							
1644					GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs							
1645					GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)							
1646					For such situations, GROS method may yield incorrect values of UCLs and BTVs							
1647					This is especially true when the sample size is small.							
1648					For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates							
1649					Minimum	0.01	Mean					0.136
1650					Maximum	1.1	Median					0.082
1651					SD	0.18	CV					1.326
1652					k hat (MLE)	0.761	k star (bias corrected MLE)					0.745
1653					Theta hat (MLE)	0.178	Theta star (bias corrected MLE)					0.182
1654					nu hat (MLE)	152.1	nu star (bias corrected)					148.9
1655					Adjusted Level of Significance (β)	0.0476						
1656					Approximate Chi Square Value (148.92, α)	121.7	Adjusted Chi Square Value (148.92, β)					121.4
1657					95% Gamma Approximate UCL (use when n>=50)	0.166	95% Gamma Adjusted UCL (use when n<50)					0.166
1658												
1659					**Estimates of Gamma Parameters using KM Estimates**							
1660					Mean (KM)	0.138	SD (KM)					0.164
1661					Variance (KM)	0.027	SE of Mean (KM)					0.0179
1662					k hat (KM)	0.706	k star (KM)					0.692
1663					nu hat (KM)	141.2	nu star (KM)					138.3
1664					theta hat (KM)	0.195	theta star (KM)					0.2

1665	80% gamma percentile (KM)					0.227	90% gamma percentile (KM)					0.347
1666	95% gamma percentile (KM)					0.472	99% gamma percentile (KM)					0.769
1667												
1668	**Gamma Kaplan-Meier (KM) Statistics**											
1669	Approximate Chi Square Value (138.30, α)					112.1	Adjusted Chi Square Value (138.30, β)					111.8
1670	95% Gamma Approximate KM-UCL (use when n>=50)					0.17	95% Gamma Adjusted KM-UCL (use when n<50)					0.171
1671												
1672	**Lognormal GOF Test on Detected Observations Only**											
1673	Shapiro Wilk Test Statistic					0.942	**Shapiro Wilk GOF Test**					
1674	5% Shapiro Wilk Critical Value					0.923	Detected Data appear Lognormal at 5% Significance Level					
1675	Lilliefors Test Statistic					0.164	**Lilliefors GOF Test**					
1676	5% Lilliefors Critical Value					0.167	Detected Data appear Lognormal at 5% Significance Level					
1677	**Detected Data appear Lognormal at 5% Significance Level**											
1678												
1679	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1680	Mean in Original Scale					0.15	Mean in Log Scale					-2.249
1681	SD in Original Scale					0.167	SD in Log Scale					0.799
1682	95% t UCL (assumes normality of ROS data)					0.178	95% Percentile Bootstrap UCL					0.18
1683	95% BCA Bootstrap UCL					0.187	95% Bootstrap t UCL					0.187
1684	95% H-UCL (Log ROS)					0.172						
1685												
1686	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1687	KM Mean (logged)					-2.279	KM Geo Mean					0.102
1688	KM SD (logged)					0.649	95% Critical H Value (KM-Log)					1.97
1689	KM Standard Error of Mean (logged)					0.0971	95% H-UCL (KM -Log)					0.144
1690	KM SD (logged)					0.649	95% Critical H Value (KM-Log)					1.97
1691	KM Standard Error of Mean (logged)					0.0971						
1692												
1693	**DL/2 Statistics**											
1694	**DL/2 Normal**						**DL/2 Log-Transformed**					
1695	Mean in Original Scale					0.148	Mean in Log Scale					-2.134
1696	SD in Original Scale					0.16	SD in Log Scale					0.542
1697	95% t UCL (Assumes normality)					0.175	95% H-Stat UCL					0.152
1698	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1699												
1700	**Nonparametric Distribution Free UCL Statistics**											
1701	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**											
1702												
1703	**Suggested UCL to Use**											
1704	95% KM Approximate Gamma UCL					0.17	95% GROS Approximate Gamma UCL					0.166
1705												
1706	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
1707	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
1708												
1709	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1710	Recommendations are based upon data size, data distribution, and skewness.											
1711	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1712	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1713												

1	**UCL Statistics for Data Sets with Non-Detects**											
2												
3			User Selected Options									
4			Date/Time of Computation	ProUCL 5.111/27/2017 6:09:58 PM								
5			From File	GW528-GW_RA_Formatted_Data_b.xls								
6			Full Precision	OFF								
7			Confidence Coefficient	95%								
8			Number of Bootstrap Operations	2000								
9												
10	**Val_LEAD_212**											
11												
12	**General Statistics**											
13						Total Number of Observations	42			Number of Distinct Observations	40	
14						Number of Detects	9			Number of Non-Detects	33	
15						Number of Distinct Detects	9			Number of Distinct Non-Detects	31	
16						Minimum Detect	1.96			Minimum Non-Detect	1.83	
17						Maximum Detect	8.5			Maximum Non-Detect	9.07	
18						Variance Detects	4.86			Percent Non-Detects	78.57%	
19						Mean Detects	4.988			SD Detects	2.205	
20						Median Detects	4.74			CV Detects	0.442	
21						Skewness Detects	0.194			Kurtosis Detects	-0.888	
22						Mean of Logged Detects	1.507			SD of Logged Detects	0.496	
23												
24	**Normal GOF Test on Detects Only**											
25						Shapiro Wilk Test Statistic	0.949			**Shapiro Wilk GOF Test**		
26						5% Shapiro Wilk Critical Value	0.829			Detected Data appear Normal at 5% Significance Level		
27						Lilliefors Test Statistic	0.19			**Lilliefors GOF Test**		
28						5% Lilliefors Critical Value	0.274			Detected Data appear Normal at 5% Significance Level		
29	**Detected Data appear Normal at 5% Significance Level**											
30												
31	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
32						KM Mean	2.793			KM Standard Error of Mean	0.324	
33						KM SD	1.701			95% KM (BCA) UCL	3.376	
34						95% KM (t) UCL	3.339			95% KM (Percentile Bootstrap) UCL	3.311	
35						95% KM (z) UCL	3.326			95% KM Bootstrap t UCL	3.43	
36						90% KM Chebyshev UCL	3.766			95% KM Chebyshev UCL	4.206	
37						97.5% KM Chebyshev UCL	4.817			99% KM Chebyshev UCL	6.018	
38												
39	**Gamma GOF Tests on Detected Observations Only**											
40						A-D Test Statistic	0.298			**Anderson-Darling GOF Test**		
41						5% A-D Critical Value	0.723			Detected data appear Gamma Distributed at 5% Significance Level		
42						K-S Test Statistic	0.167			**Kolmogorov-Smirnov GOF**		
43						5% K-S Critical Value	0.28			Detected data appear Gamma Distributed at 5% Significance Level		
44	**Detected data appear Gamma Distributed at 5% Significance Level**											
45												
46	**Gamma Statistics on Detected Data Only**											
47						k hat (MLE)	5.151			k star (bias corrected MLE)	3.508	
48						Theta hat (MLE)	0.968			Theta star (bias corrected MLE)	1.422	
49						nu hat (MLE)	92.71			nu star (bias corrected)	63.14	
50						Mean (detects)	4.988					
51												
52	**Gamma ROS Statistics using Imputed Non-Detects**											

53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
56	This is especially true when the sample size is small.											
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
58					Minimum	0.01				Mean		1.806
59					Maximum	8.5				Median		1.23
60					SD	1.978				CV		1.095
61					k hat (MLE)	1.091				k star (bias corrected MLE)		1.029
62					Theta hat (MLE)	1.655				Theta star (bias corrected MLE)		1.755
63					nu hat (MLE)	91.66				nu star (bias corrected)		86.45
64					Adjusted Level of Significance (β)	0.0443						
65					Approximate Chi Square Value (86.45, α)	66.01				Adjusted Chi Square Value (86.45, β)		65.38
66					95% Gamma Approximate UCL (use when n>=50)	2.365				95% Gamma Adjusted UCL (use when n<50)		2.388
67												
68	**Estimates of Gamma Parameters using KM Estimates**											
69					Mean (KM)	2.793				SD (KM)		1.701
70					Variance (KM)	2.893				SE of Mean (KM)		0.324
71					k hat (KM)	2.697				k star (KM)		2.52
72					nu hat (KM)	226.5				nu star (KM)		211.7
73					theta hat (KM)	1.036				theta star (KM)		1.108
74					80% gamma percentile (KM)	4.068				90% gamma percentile (KM)		5.151
75					95% gamma percentile (KM)	6.17				99% gamma percentile (KM)		8.4
76												
77	**Gamma Kaplan-Meier (KM) Statistics**											
78					Approximate Chi Square Value (211.69, α)	179				Adjusted Chi Square Value (211.69, β)		178
79					95% Gamma Approximate KM-UCL (use when n>=50)	3.303				95% Gamma Adjusted KM-UCL (use when n<50)		3.323
80												
81	**Lognormal GOF Test on Detected Observations Only**											
82					Shapiro Wilk Test Statistic	0.931				**Shapiro Wilk GOF Test**		
83					5% Shapiro Wilk Critical Value	0.829				Detected Data appear Lognormal at 5% Significance Level		
84					Lilliefors Test Statistic	0.194				**Lilliefors GOF Test**		
85					5% Lilliefors Critical Value	0.274				Detected Data appear Lognormal at 5% Significance Level		
86	**Detected Data appear Lognormal at 5% Significance Level**											
87												
88	**Lognormal ROS Statistics Using Imputed Non-Detects**											
89					Mean in Original Scale	2.301				Mean in Log Scale		0.666
90					SD in Original Scale	1.735				SD in Log Scale		0.519
91					95% t UCL (assumes normality of ROS data)	2.752				95% Percentile Bootstrap UCL		2.77
92					95% BCA Bootstrap UCL	2.896				95% Bootstrap t UCL		2.939
93					95% H-UCL (Log ROS)	2.6						
94												
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
96					KM Mean (logged)	0.899				KM Geo Mean		2.458
97					KM SD (logged)	0.461				95% Critical H Value (KM-Log)		1.871
98					KM Standard Error of Mean (logged)	0.0939				95% H-UCL (KM -Log)		3.127
99					KM SD (logged)	0.461				95% Critical H Value (KM-Log)		1.871
100					KM Standard Error of Mean (logged)	0.0939						
101												
102	**DL/2 Statistics**											
103	**DL/2 Normal**									**DL/2 Log-Transformed**		
104					Mean in Original Scale	2.924				Mean in Log Scale		0.914

105					SD in Original Scale	1.722					SD in Log Scale	0.581
106					95% t UCL (Assumes normality)	3.371					95% H-Stat UCL	3.526
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
108												
109	**Nonparametric Distribution Free UCL Statistics**											
110	**Detected Data appear Normal Distributed at 5% Significance Level**											
111												
112	**Suggested UCL to Use**											
113					95% KM (t) UCL	3.339						
114												
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
116	Recommendations are based upon data size, data distribution, and skewness.											
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
119												
120	**Val_POTASSIUM_40**											
121												
122	**General Statistics**											
123					Total Number of Observations	62					Number of Distinct Observations	58
124					Number of Detects	28					Number of Non-Detects	34
125					Number of Distinct Detects	28					Number of Distinct Non-Detects	31
126					Minimum Detect	12.2					Minimum Non-Detect	9.18
127					Maximum Detect	160					Maximum Non-Detect	55.9
128					Variance Detects	2400					Percent Non-Detects	54.84%
129					Mean Detects	58.8					SD Detects	48.99
130					Median Detects	33.55					CV Detects	0.833
131					Skewness Detects	0.949					Kurtosis Detects	-0.615
132					Mean of Logged Detects	3.738					SD of Logged Detects	0.838
133												
134	**Normal GOF Test on Detects Only**											
135					Shapiro Wilk Test Statistic	0.812	**Shapiro Wilk GOF Test**					
136					5% Shapiro Wilk Critical Value	0.924	Detected Data Not Normal at 5% Significance Level					
137					Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**					
138					5% Lilliefors Critical Value	0.164	Detected Data Not Normal at 5% Significance Level					
139	**Detected Data Not Normal at 5% Significance Level**											
140												
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
142					KM Mean	33.54					KM Standard Error of Mean	5.224
143					KM SD	40					95% KM (BCA) UCL	42.64
144					95% KM (t) UCL	42.26					95% KM (Percentile Bootstrap) UCL	43
145					95% KM (z) UCL	42.13					95% KM Bootstrap t UCL	44.11
146					90% KM Chebyshev UCL	49.21					95% KM Chebyshev UCL	56.31
147					97.5% KM Chebyshev UCL	66.16					99% KM Chebyshev UCL	85.52
148												
149	**Gamma GOF Tests on Detected Observations Only**											
150					A-D Test Statistic	1.164	**Anderson-Darling GOF Test**					
151					5% A-D Critical Value	0.761	Detected Data Not Gamma Distributed at 5% Significance Level					
152					K-S Test Statistic	0.2	**Kolmogorov-Smirnov GOF**					
153					5% K-S Critical Value	0.168	Detected Data Not Gamma Distributed at 5% Significance Level					
154	**Detected Data Not Gamma Distributed at 5% Significance Level**											
155												
156	**Gamma Statistics on Detected Data Only**											

157					k hat (MLE)	1.634				k star (bias corrected MLE)		1.483
158					Theta hat (MLE)	35.99				Theta star (bias corrected MLE)		39.66
159					nu hat (MLE)	91.5				nu star (bias corrected)		83.03
160					Mean (detects)	58.8						
161												
162	**Gamma ROS Statistics using Imputed Non-Detects**											
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
166	This is especially true when the sample size is small.											
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
168					Minimum	0.01				Mean		26.69
169					Maximum	160				Median		0.01
170					SD	43.89				CV		1.645
171					k hat (MLE)	0.185				k star (bias corrected MLE)		0.187
172					Theta hat (MLE)	143.9				Theta star (bias corrected MLE)		142.5
173					nu hat (MLE)	23				nu star (bias corrected)		23.22
174					Adjusted Level of Significance (β)	0.0461						
175					Approximate Chi Square Value (23.22, α)	13.26				Adjusted Chi Square Value (23.22, β)		13.08
176					95% Gamma Approximate UCL (use when n>=50)	46.75				95% Gamma Adjusted UCL (use when n<50)		47.39
177												
178	**Estimates of Gamma Parameters using KM Estimates**											
179					Mean (KM)	33.54				SD (KM)		40
180					Variance (KM)	1600				SE of Mean (KM)		5.224
181					k hat (KM)	0.703				k star (KM)		0.68
182					nu hat (KM)	87.18				nu star (KM)		84.3
183					theta hat (KM)	47.7				theta star (KM)		49.34
184					80% gamma percentile (KM)	55.18				90% gamma percentile (KM)		84.77
185					95% gamma percentile (KM)	115.4				99% gamma percentile (KM)		188.6
186												
187	**Gamma Kaplan-Meier (KM) Statistics**											
188					Approximate Chi Square Value (84.30, α)	64.14				Adjusted Chi Square Value (84.30, β)		63.72
189					95% Gamma Approximate KM-UCL (use when n>=50)	44.08				95% Gamma Adjusted KM-UCL (use when n<50)		44.37
190												
191	**Lognormal GOF Test on Detected Observations Only**											
192					Shapiro Wilk Test Statistic	0.916				**Shapiro Wilk GOF Test**		
193					5% Shapiro Wilk Critical Value	0.924				Detected Data Not Lognormal at 5% Significance Level		
194					Lilliefors Test Statistic	0.154				**Lilliefors GOF Test**		
195					5% Lilliefors Critical Value	0.164				Detected Data appear Lognormal at 5% Significance Level		
196	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
197												
198	**Lognormal ROS Statistics Using Imputed Non-Detects**											
199					Mean in Original Scale	31.26				Mean in Log Scale		2.826
200					SD in Original Scale	41.27				SD in Log Scale		1.044
201					95% t UCL (assumes normality of ROS data)	40.01				95% Percentile Bootstrap UCL		40.2
202					95% BCA Bootstrap UCL	41.82				95% Bootstrap t UCL		41.38
203					95% H-UCL (Log ROS)	39.44						
204												
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
206					KM Mean (logged)	3.026				KM Geo Mean		20.62
207					KM SD (logged)	0.902				95% Critical H Value (KM-Log)		2.182
208					KM Standard Error of Mean (logged)	0.124				95% H-UCL (KM -Log)		39.87

209					KM SD (logged)	0.902				95% Critical H Value (KM-Log)		2.182
210					KM Standard Error of Mean (logged)	0.124						
211												
212	**DL/2 Statistics**											
213	**DL/2 Normal**						**DL/2 Log-Transformed**					
214					Mean in Original Scale	33.91				Mean in Log Scale		2.999
215					SD in Original Scale	40.23				SD in Log Scale		1.002
216					95% t UCL (Assumes normality)	42.44				95% H-Stat UCL		44.28
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
218												
219	**Nonparametric Distribution Free UCL Statistics**											
220	**Detected Data appear Approximate Lognormal Distributed at 5% Significance Level**											
221												
222	**Suggested UCL to Use**											
223					KM H-UCL	39.87						
224												
225	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
226	Recommendations are based upon data size, data distribution, and skewness.											
227	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
228	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
229												
230	**Val_RADIUM_226**											
231												
232	**General Statistics**											
233					Total Number of Observations	87				Number of Distinct Observations		70
234					Number of Detects	16				Number of Non-Detects		71
235					Number of Distinct Detects	16				Number of Distinct Non-Detects		57
236					Minimum Detect	22.3				Minimum Non-Detect		17
237					Maximum Detect	103				Maximum Non-Detect		103
238					Variance Detects	910				Percent Non-Detects		81.61%
239					Mean Detects	52.98				SD Detects		30.17
240					Median Detects	50.95				CV Detects		0.569
241					Skewness Detects	0.434				Kurtosis Detects		-1.465
242					Mean of Logged Detects	3.806				SD of Logged Detects		0.603
243												
244	**Normal GOF Test on Detects Only**											
245					Shapiro Wilk Test Statistic	0.853	**Shapiro Wilk GOF Test**					
246					5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level					
247					Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**					
248					5% Lilliefors Critical Value	0.213	Detected Data appear Normal at 5% Significance Level					
249	**Detected Data appear Approximate Normal at 5% Significance Level**											
250												
251	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
252					KM Mean	25.07				KM Standard Error of Mean		2.214
253					KM SD	18.99				95% KM (BCA) UCL		30.32
254					95% KM (t) UCL	28.75				95% KM (Percentile Bootstrap) UCL		29.07
255					95% KM (z) UCL	28.72				95% KM Bootstrap t UCL		29.18
256					90% KM Chebyshev UCL	31.72				95% KM Chebyshev UCL		34.72
257					97.5% KM Chebyshev UCL	38.9				99% KM Chebyshev UCL		47.1
258												
259	**Gamma GOF Tests on Detected Observations Only**											
260					A-D Test Statistic	0.93	**Anderson-Darling GOF Test**					

261				5% A-D Critical Value		0.744	Detected Data Not Gamma Distributed at 5% Significance Level					
262				K-S Test Statistic		0.21	**Kolmogorov-Smirnov GOF**					
263				5% K-S Critical Value		0.217	Detected data appear Gamma Distributed at 5% Significance Level					
264	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
265												
266	**Gamma Statistics on Detected Data Only**											
267				k hat (MLE)		3.197	k star (bias corrected MLE)					2.64
268				Theta hat (MLE)		16.57	Theta star (bias corrected MLE)					20.07
269				nu hat (MLE)		102.3	nu star (bias corrected)					84.47
270				Mean (detects)		52.98						
271												
272	**Gamma ROS Statistics using Imputed Non-Detects**											
273	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
274	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
275	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
276	This is especially true when the sample size is small.											
277	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
278				Minimum		0.01	Mean					10.23
279				Maximum		103	Median					0.01
280				SD		24.04	CV					2.349
281				k hat (MLE)		0.16	k star (bias corrected MLE)					0.162
282				Theta hat (MLE)		64.05	Theta star (bias corrected MLE)					63.2
283				nu hat (MLE)		27.8	nu star (bias corrected)					28.18
284				Adjusted Level of Significance (β)		0.0472						
285				Approximate Chi Square Value (28.18, α)		17.07	Adjusted Chi Square Value (28.18, β)					16.92
286				95% Gamma Approximate UCL (use when n>=50)		16.9	95% Gamma Adjusted UCL (use when n<50)					17.04
287												
288	**Estimates of Gamma Parameters using KM Estimates**											
289				Mean (KM)		25.07	SD (KM)					18.99
290				Variance (KM)		360.5	SE of Mean (KM)					2.214
291				k hat (KM)		1.744	k star (KM)					1.691
292				nu hat (KM)		303.4	nu star (KM)					294.3
293				theta hat (KM)		14.38	theta star (KM)					14.82
294				80% gamma percentile (KM)		38.28	90% gamma percentile (KM)					50.75
295				95% gamma percentile (KM)		62.77	99% gamma percentile (KM)					89.7
296												
297	**Gamma Kaplan-Meier (KM) Statistics**											
298				Approximate Chi Square Value (294.31, α)		255.6	Adjusted Chi Square Value (294.31, β)					255
299				95% Gamma Approximate KM-UCL (use when n>=50)		28.87	95% Gamma Adjusted KM-UCL (use when n<50)					28.94
300												
301	**Lognormal GOF Test on Detected Observations Only**											
302				Shapiro Wilk Test Statistic		0.852	**Shapiro Wilk GOF Test**					
303				5% Shapiro Wilk Critical Value		0.887	Detected Data Not Lognormal at 5% Significance Level					
304				Lilliefors Test Statistic		0.203	**Lilliefors GOF Test**					
305				5% Lilliefors Critical Value		0.213	Detected Data appear Lognormal at 5% Significance Level					
306	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
307												
308	**Lognormal ROS Statistics Using Imputed Non-Detects**											
309				Mean in Original Scale		17.62	Mean in Log Scale					2.521
310				SD in Original Scale		21.19	SD in Log Scale					0.707
311				95% t UCL (assumes normality of ROS data)		21.4	95% Percentile Bootstrap UCL					21.63
312				95% BCA Bootstrap UCL		22.24	95% Bootstrap t UCL					22.52

	A	B	C	D	E	F	G	H	I	J	K	L
313					95% H-UCL (Log ROS)	18.62						
314												
315	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
316					KM Mean (logged)	3.073				KM Geo Mean		21.6
317					KM SD (logged)	0.464				95% Critical H Value (KM-Log)		1.824
318					KM Standard Error of Mean (logged)	0.0574				95% H-UCL (KM -Log)		26.35
319					KM SD (logged)	0.464				95% Critical H Value (KM-Log)		1.824
320					KM Standard Error of Mean (logged)	0.0574						
321												
322	**DL/2 Statistics**											
323	**DL/2 Normal**						**DL/2 Log-Transformed**					
324					Mean in Original Scale	25.53				Mean in Log Scale		3.004
325					SD in Original Scale	20.74				SD in Log Scale		0.65
326					95% t UCL (Assumes normality)	29.23				95% H-Stat UCL		28.56
327	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
328												
329	**Nonparametric Distribution Free UCL Statistics**											
330	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**											
331												
332	**Suggested UCL to Use**											
333					95% KM (t) UCL	28.75						
334												
335	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
336	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
337												
338	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
339	Recommendations are based upon data size, data distribution, and skewness.											
340	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
341	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
342												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.112/5/2017 6:13:23 PM
From File	GW528-GW_RA_TEQ_Cong_Formatted_Data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_TCDD_TEQ

General Statistics

Total Number of Observations	47	Number of Distinct Observations	33
Number of Detects	32	Number of Non-Detects	15
Number of Distinct Detects	32	Number of Distinct Non-Detects	1
Minimum Detect	3.2000E-9	Minimum Non-Detect	0
Maximum Detect	1.1960E-5	Maximum Non-Detect	0
Variance Detects	8.296E-12	Percent Non-Detects	31.91%
Mean Detects	1.4570E-6	SD Detects	2.8803E-6
Median Detects	1.8902E-7	CV Detects	N/A
Skewness Detects	2.612	Kurtosis Detects	6.615

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.565	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.154	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

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

KM Mean	9.9203E-7	KM Standard Error of Mean	3.6098E-7
KM SD	2.4358E-6	95% KM (BCA) UCL	1.6324E-6
95% KM (t) UCL	1.5980E-6	95% KM (Percentile Bootstrap) UCL	1.5898E-6
95% KM (z) UCL	1.5858E-6	95% KM Bootstrap t UCL	2.0917E-6
90% KM Chebyshev UCL	2.0750E-6	95% KM Chebyshev UCL	2.5655E-6
97.5% KM Chebyshev UCL	3.2464E-6	99% KM Chebyshev UCL	4.5838E-6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.286	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.842	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.19	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.167	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.356	k star (bias corrected MLE)	0.344
Theta hat (MLE)	4.0877E-6	Theta star (bias corrected MLE)	4.2373E-6
nu hat (MLE)	22.81	nu star (bias corrected)	22.01
Mean (detects)	1.4570E-6		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	9.9203E-7	SD (KM)	2.4358E-6

53					Variance (KM)	5.933E-12				SE of Mean (KM)		3.6098E-7
54					k hat (KM)	0.166				k star (KM)		0.169
55					nu hat (KM)	15.59				nu star (KM)		15.93
56					theta hat (KM)	5.9808E-6				theta star (KM)		5.8539E-6
57					80% gamma percentile (KM)	1.1834E-6				90% gamma percentile (KM)		2.9804E-6
58					95% gamma percentile (KM)	5.3219E-6				99% gamma percentile (KM)		1.1957E-5
59												
60					**Gamma Kaplan-Meier (KM) Statistics**							
61										Adjusted Level of Significance (β)		0.0449
62					Approximate Chi Square Value (15.93, α)	7.913				Adjusted Chi Square Value (15.93, β)		7.733
63					95% Gamma Approximate KM-UCL (use when n>=50)	1.9972E-6				95% Gamma Adjusted KM-UCL (use when n<50)		2.0435E-6
64												
65					**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**							
66					KM Mean (logged)	N/A				KM Geo Mean		N/A
67					KM SD (logged)	N/A				95% Critical H Value (KM-Log)		N/A
68					KM Standard Error of Mean (logged)	N/A				95% H-UCL (KM -Log)		N/A
69					KM SD (logged)	N/A				95% Critical H Value (KM-Log)		N/A
70					KM Standard Error of Mean (logged)	N/A						
71												
72					**DL/2 Statistics**							
73					Mean in Original Scale	9.9203E-7				SD in Original Scale		2.4621E-6
74					95% t UCL (Assumes normality)	1.5949E-6						
75					**DL/2 is not a recommended method, provided for comparisons and historical reasons**							
76												
77					**Nonparametric Distribution Free UCL Statistics**							
78					**Data do not follow a Discernible Distribution at 5% Significance Level**							
79												
80					**Suggested UCL to Use**							
81					99% KM (Chebyshev) UCL	4.5838E-6						
82												
83					Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.							
84					Recommendations are based upon data size, data distribution, and skewness.							
85					These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).							
86					However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.							
87												
88												
89	**Val_PCB_HiRiskCong**											
90												
91					**General Statistics**							
92					Total Number of Observations	18				Number of Distinct Observations		18
93										Number of Missing Observations		0
94					Minimum	0.00227				Mean		0.0427
95					Maximum	0.124				Median		0.0337
96					SD	0.0365				Std. Error of Mean		0.00861
97					Coefficient of Variation	0.855				Skewness		1.108
98												
99					**Normal GOF Test**							
100					Shapiro Wilk Test Statistic	0.882				**Shapiro Wilk GOF Test**		
101					5% Shapiro Wilk Critical Value	0.897				Data Not Normal at 5% Significance Level		
102					Lilliefors Test Statistic	0.168				**Lilliefors GOF Test**		
103					5% Lilliefors Critical Value	0.202				Data appear Normal at 5% Significance Level		
104					**Data appear Approximate Normal at 5% Significance Level**							

105												
106	**Assuming Normal Distribution**											
107	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
108					95% Student's-t UCL	0.0577				95% Adjusted-CLT UCL (Chen-1995)		0.0593
109										95% Modified-t UCL (Johnson-1978)		0.0581
110												
111	**Gamma GOF Test**											
112					A-D Test Statistic	0.265	**Anderson-Darling Gamma GOF Test**					
113					5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level					
114					K-S Test Statistic	0.109	**Kolmogorov-Smirnov Gamma GOF Test**					
115					5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level					
116	**Detected data appear Gamma Distributed at 5% Significance Level**											
117												
118	**Gamma Statistics**											
119					k hat (MLE)	1.183				k star (bias corrected MLE)		1.023
120					Theta hat (MLE)	0.0361				Theta star (bias corrected MLE)		0.0418
121					nu hat (MLE)	42.61				nu star (bias corrected)		36.84
122					MLE Mean (bias corrected)	0.0427				MLE Sd (bias corrected)		0.0422
123										Approximate Chi Square Value (0.05)		23.94
124					Adjusted Level of Significance	0.0357				Adjusted Chi Square Value		22.95
125												
126	**Assuming Gamma Distribution**											
127					95% Approximate Gamma UCL (use when n>=50))	0.0657				95% Adjusted Gamma UCL (use when n<50)		0.0686
128												
129	**Lognormal GOF Test**											
130					Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**					
131					5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level					
132					Lilliefors Test Statistic	0.168	**Lilliefors Lognormal GOF Test**					
133					5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level					
134	**Data appear Lognormal at 5% Significance Level**											
135												
136	**Lognormal Statistics**											
137					Minimum of Logged Data	-6.088				Mean of logged Data		-3.632
138					Maximum of Logged Data	-2.087				SD of logged Data		1.178
139												
140	**Assuming Lognormal Distribution**											
141					95% H-UCL	0.122				90% Chebyshev (MVUE) UCL		0.0972
142					95% Chebyshev (MVUE) UCL	0.119				97.5% Chebyshev (MVUE) UCL		0.148
143					99% Chebyshev (MVUE) UCL	0.207						
144												
145	**Nonparametric Distribution Free UCL Statistics**											
146	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
147												
148	**Nonparametric Distribution Free UCLs**											
149					95% CLT UCL	0.0569				95% Jackknife UCL		0.0577
150					95% Standard Bootstrap UCL	0.0562				95% Bootstrap-t UCL		0.0618
151					95% Hall's Bootstrap UCL	0.0622				95% Percentile Bootstrap UCL		0.0571
152					95% BCA Bootstrap UCL	0.0584						
153					90% Chebyshev(Mean, Sd) UCL	0.0686				95% Chebyshev(Mean, Sd) UCL		0.0803
154					97.5% Chebyshev(Mean, Sd) UCL	0.0965				99% Chebyshev(Mean, Sd) UCL		0.128
155												
156	**Suggested UCL to Use**											

157					95% Student's-t UCL	0.0577						
158												
159	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test											
160	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL											
161												
162	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
163	Recommendations are based upon data size, data distribution, and skewness.											
164	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
165	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
166												
167												
168	**Val_PCB_Cong_TEQ**											
169												
170	**General Statistics**											
171					Total Number of Observations	18				Number of Distinct Observations	18	
172										Number of Missing Observations	0	
173					Minimum	4.5060E-9				Mean	7.0360E-8	
174					Maximum	3.2305E-7				Median	5.2915E-8	
175					SD	7.7047E-8				Std. Error of Mean	1.8160E-8	
176					Coefficient of Variation	N/A				Skewness	2.339	
177												
178	**Normal GOF Test**											
179					Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**					
180					5% Shapiro Wilk Critical Value	0.897	Data Not Normal at 5% Significance Level					
181					Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**					
182					5% Lilliefors Critical Value	0.202	Data Not Normal at 5% Significance Level					
183	**Data Not Normal at 5% Significance Level**											
184												
185	**Assuming Normal Distribution**											
186	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
187					95% Student's-t UCL	1.0195E-7				95% Adjusted-CLT UCL (Chen-1995)	1.1093E-7	
188										95% Modified-t UCL (Johnson-1978)	1.0362E-7	
189												
190	**Gamma GOF Test**											
191					A-D Test Statistic	0.164	**Anderson-Darling Gamma GOF Test**					
192					5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level					
193					K-S Test Statistic	0.0954	**Kolmogorov-Smirnov Gamma GOF Test**					
194					5% K-S Critical Value	0.209	Detected data appear Gamma Distributed at 5% Significance Level					
195	**Detected data appear Gamma Distributed at 5% Significance Level**											
196												
197	**Gamma Statistics**											
198					k hat (MLE)	1.095				k star (bias corrected MLE)	0.95	
199					Theta hat (MLE)	6.4245E-8				Theta star (bias corrected MLE)	7.4087E-8	
200					nu hat (MLE)	39.43				nu star (bias corrected)	34.19	
201					MLE Mean (bias corrected)	7.0360E-8				MLE Sd (bias corrected)	7.2199E-8	
202										Approximate Chi Square Value (0.05)	21.82	
203					Adjusted Level of Significance	0.0357				Adjusted Chi Square Value	20.87	
204												
205	**Assuming Gamma Distribution**											
206					95% Approximate Gamma UCL (use when n>=50)	1.1027E-7				95% Adjusted Gamma UCL (use when n<50)	1.1527E-7	
207												
208	**Lognormal GOF Test**											

209					Shapiro Wilk Test Statistic	0.975	**Shapiro Wilk Lognormal GOF Test**					
210					5% Shapiro Wilk Critical Value	0.897	Data appear Lognormal at 5% Significance Level					
211					Lilliefors Test Statistic	0.113	**Lilliefors Lognormal GOF Test**					
212					5% Lilliefors Critical Value	0.202	Data appear Lognormal at 5% Significance Level					
213	**Data appear Lognormal at 5% Significance Level**											
214												
215	**Lognormal Statistics**											
216					Minimum of Logged Data	-19.22				Mean of logged Data		-16.99
217					Maximum of Logged Data	-14.95				SD of logged Data		1.134
218												
219	**Assuming Lognormal Distribution**											
220					95% H-UCL	1.7331E-7				90% Chebyshev (MVUE) UCL		1.4346E-7
221					95% Chebyshev (MVUE) UCL	1.7435E-7				97.5% Chebyshev (MVUE) UCL		2.1722E-7
222					99% Chebyshev (MVUE) UCL	3.0144E-7						
223												
224	**Nonparametric Distribution Free UCL Statistics**											
225	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
226												
227	**Nonparametric Distribution Free UCLs**											
228					95% CLT UCL	1.0023E-7				95% Jackknife UCL		1.0195E-7
229					95% Standard Bootstrap UCL	9.9892E-8				95% Bootstrap-t UCL		1.2723E-7
230					95% Hall's Bootstrap UCL	2.4139E-7				95% Percentile Bootstrap UCL		1.0178E-7
231					95% BCA Bootstrap UCL	1.1467E-7						
232					90% Chebyshev(Mean, Sd) UCL	1.2484E-7				95% Chebyshev(Mean, Sd) UCL		1.4952E-7
233					97.5% Chebyshev(Mean, Sd) UCL	1.8377E-7				99% Chebyshev(Mean, Sd) UCL		2.5105E-7
234												
235	**Suggested UCL to Use**											
236					95% Adjusted Gamma UCL	1.1527E-7						
237												
238	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
239	Recommendations are based upon data size, data distribution, and skewness.											
240	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
241	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
242												

Building Assessment Samples

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/21/2017 4:58:41 PM
From File	BLDG477-Wipe Samples_Formatted_Data.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Val_LEAD

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	268	Mean	771.1
Maximum	3260	Median	428
SD	958.7	Std. Error of Mean	319.6
Coefficient of Variation	1.243	Skewness	2.727

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

Normal GOF Test

Shapiro Wilk Test Statistic	0.567	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.386	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1365	95% Adjusted-CLT UCL (Chen-1995)	1607
		95% Modified-t UCL (Johnson-1978)	1414

Gamma GOF Test

A-D Test Statistic	1.136	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.735	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.351	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.284	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.468	k star (bias corrected MLE)	1.053
Theta hat (MLE)	525.2	Theta star (bias corrected MLE)	732.4
nu hat (MLE)	26.43	nu star (bias corrected)	18.95
MLE Mean (bias corrected)	771.1	MLE Sd (bias corrected)	751.5
		Approximate Chi Square Value (0.05)	10.08
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	8.751

53	**Assuming Gamma Distribution**											
54	95% Approximate Gamma UCL (use when n>=50))				1449	95% Adjusted Gamma UCL (use when n<50)					1670	
55												
56	**Lognormal GOF Test**											
57	Shapiro Wilk Test Statistic				0.802	**Shapiro Wilk Lognormal GOF Test**						
58	5% Shapiro Wilk Critical Value				0.829	Data Not Lognormal at 5% Significance Level						
59	Lilliefors Test Statistic				0.297	**Lilliefors Lognormal GOF Test**						
60	5% Lilliefors Critical Value				0.274	Data Not Lognormal at 5% Significance Level						
61	**Data Not Lognormal at 5% Significance Level**											
62												
63	**Lognormal Statistics**											
64	Minimum of Logged Data				5.591	Mean of logged Data					6.27	
65	Maximum of Logged Data				8.089	SD of logged Data					0.79	
66												
67	**Assuming Lognormal Distribution**											
68	95% H-UCL				1576	90% Chebyshev (MVUE) UCL					1255	
69	95% Chebyshev (MVUE) UCL				1510	97.5% Chebyshev (MVUE) UCL					1864	
70	99% Chebyshev (MVUE) UCL				2559							
71												
72	**Nonparametric Distribution Free UCL Statistics**											
73	**Data do not follow a Discernible Distribution (0.05)**											
74												
75	**Nonparametric Distribution Free UCLs**											
76	95% CLT UCL				1297	95% Jackknife UCL					1365	
77	95% Standard Bootstrap UCL				1286	95% Bootstrap-t UCL					4787	
78	95% Hall's Bootstrap UCL				3961	95% Percentile Bootstrap UCL					1373	
79	95% BCA Bootstrap UCL				1633							
80	90% Chebyshev(Mean, Sd) UCL				1730	95% Chebyshev(Mean, Sd) UCL					2164	
81	97.5% Chebyshev(Mean, Sd) UCL				2767	99% Chebyshev(Mean, Sd) UCL					3951	
82												
83	**Suggested UCL to Use**											
84	95% Chebyshev (Mean, Sd) UCL				2164							
85												
86	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
87	Recommendations are based upon data size, data distribution, and skewness.											
88	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
89	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
90												

ATTACHMENT C.2

INDOOR WORKER VISLA

Site-specific VISL Results
Commercial Equation Inputs

*** Inputted values different from Commercial defaults are highlighted.**
Output generated 26MAR2018:11:37:35

Variable	Commercial Air Default Value	Value
AF_{gw} (Attenuation Factor Groundwater) unitless	0.001	0.001
AF_{ss} (Attenuation Factor Sub-Slab) unitless	0.03	0.03
AT_w (averaging time - composite worker)	365	365
ED_w (exposure duration - composite worker) yr	25	25
EF_w (exposure frequency - composite worker) day/yr	250	250
ET_w (exposure time - composite worker) hr	8	8
THQ (target hazard quotient) unitless	0.1	1
LT (lifetime) yr	70	70
TR (target risk) unitless	0.000001	0.000001

Commercial Vapor Intrusion Screening Levels (VISL)

User's Guide Variable References

Output generated 26MAR2018:11:37:35

Chemical	**CAS Number**	**Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)**	**Does the chemical have inhalation toxicity data? (IUR and/or RfC)**	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Soil Source? (C_{vp} > $C_{i,a}$,Target?)	Is Chemical Sufficiently Volatile and Toxic to Pose Inhalation Risk Via Vapor Intrusion from Groundwater Source? (C_{hc} > $C_{i,a}$,Target?)	Target Indoor Air Concentration (TCR=1E-06 or THQ=1) MIN($C_{ia,c}$,$C_{ia,nc}$) (µg/m^3)	**Toxicity Basis**	Target Sub-Slab and Exterior Soil Gas Concentration (TCR=1E-06 or THQ=1) C_{sg},Target (µg/m^3)	Target Groundwater Concentration (TCR=1E-06 or THQ=1) C_{gw},Target (µg/L)	Is Target Groundwater Concentration < MCL? (C_{gw} < MCL?)	Pure Phase Vapor Concentration C_{vp} (25 °C) (µg/m^3)	Maximum Groundwater Vapor Concentration C_{hc} (µg/m^3)
Cyanide (CN-)	57-12-5	Yes	Yes	Yes	Yes	3.5	NC	117	844	No (200)	431000000	396000000
Mercury (elemental)	7439-97-6	Yes	Yes	Yes	Yes	1.31	NC	43.8	3.73	No (2)	21100	21100
Vinyl Chloride	75-01-4	Yes	Yes	Yes	Yes	2.79	CA	92.9	2.45	No (2)	10000000000	10000000000

Temperature for Maximum Groundwater Vapor Concentration ($^{\circ}$C)	**Lower Explosive Limit LEL (% by volume)**	**LEL Ref**	Inhalation Unit Risk $(ug/m^3)^{-1}$	**IUR Ref**	Chronic RfC (mg/m^3)	**Chronic RfC Ref**	**Mutagenic Indicator**	Carcinogenic VISL TCR=1E-06 $C_{ia,c}$ ($\mu g/m^3$)	Noncarcinogenic VISL THQ=1 $C_{ia,nc}$ ($\mu g/m^3$)
25					0.0008	S			3.5
25					0.0003	I			1.31
25	3.6	CRC89	0.0000044	I	0.1	I	Mut	2.79	438

Commercial Vapor Intrusion Risk

Output generated 26MAR2018:11:37:35

Chemical	**CAS Number**	Site Groundwater Concentration C_{gw} (µg/L)	Site Indoor Air Concentration $C_{i,a}$ (µg/m^3)	**VI Carcinogenic Risk CR**	**VI Hazard HQ**	Inhalation Unit Risk (ug/m^3)$^{-1}$	**IUR Ref**	Chronic RfC (mg/m^3)	**RfC Ref**	Temperature ($^{\circ}$C) for Groundwater Vapor Concentration	**Mutagen?**
Cyanide (CN-)	57-12-5	15.34	0.0637		0.0182			0.0008	SURROGATE	25	
Mercury (elemental)	7439-97-6	0.17	0.0598		0.0455			0.0003	IRIS	25	
Vinyl Chloride	75-01-4	5.1	5.8	0.00000208	0.0132	0.0000044	I	0.1	IRIS	25	Mut
**Sum*				*0.00000208*	*0.0769*						

Chemical Properties

Output generated 26MAR2018:11:37:35

Chemical	CAS Number	Does the chemical meet the definition for volatility? (HLC>1E-5 or VP>1)	Does the chemical have inhalation toxicity data? (IUR and/or RfC)	MW Ref	Vapor Pressure VP (mm Hg)	VP Ref	Pure Component Water Solubility S (mg/L)	S Ref
Cyanide (CN-)	57-12-5	Yes	Yes	PHYSPROP	308	PHYSPROP	95400	PHYSPROP
Mercury (elemental)	7439-97-6	Yes	Yes	PHYSPROP	0.00196	PHYSPROP	0.06	PHYSPROP
Vinyl Chloride	75-01-4	Yes	Yes	PHYSPROP	2980	EPI	8800	PHYSPROP

MCL (ug/L)	Henry's Law Constant @25°C (atm-m^3/mole)	**Henry's Law Constant (unitless)**	**H`& HLC Ref**	**Henry's Law Constant Used in Calcs (unitless)**	Air Diffusivity D_{ia} (cm^2/s)	D_{ia} Ref	Water Diffusivity D_{iw} (cm^2/s)	D_{iw} Ref
200	0.000101	0.00415	Ma et al 2010	0.00415	0.211	R9	0.0000246	WATER9 (U.S. EPA, 2001)
2	0.00862	0.352	PHYSPROP VP/S	0.352	0.0307	R9	0.0000063	WATER9 (U.S. EPA, 2001)
2	0.0278	1.14	PHYSPROP	1.14	0.107	R9	0.000012	WATER9 (U.S. EPA, 2001)

Normal Boiling Point T_{boil} (K)	**BP Ref**	Critical Temperature T_{crit} (K)	T_{crit} Ref	Enthalpy of vaporization at the normal boiling point $\Delta H_{v,b}$ (cal/mol)	$\Delta H_{v,b}$ Ref	Organic Carbon Partition Coefficient K_{oc} (cm3/g)	K_{oc} Ref	**Lower Explosive Limit LEL (% by volume)**	**LEL Ref**
629.75	PRO	1760	CRC89	14127.63	CRC89				
259.85	PRO	425	CRC89	4971.32	CRC89	21.73	EPI	3.6	CRC89

ATTACHMENT C.3

VDEQ CW TRENCH RISKS

For Mass-Transfer Coefficients			For Emission Flux and Concentration in Trench			Trench dimensions		
Kg,H2O	0.833	cm/s	CF1	1.00E-03	L/cm3	Length	**8**	ft
MWH2O	18		CF2	1.00E+04	cm2/m2		2.44	m
Kl,O2	0.002	cm/s	CF3	3600	s/hr	Width	**3**	ft
MWO2	32		F	**1**			0.91	m
T	**77**	F	ACH	2	hr-1	Depth	**8**	ft
T	298	K					2.44	m
R	8.20E-05	atm-m3/mol-K				Width/Depth	0.38	

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
TAL Inorganics									
Aluminum	7429-90-5	26.98							
Antimony	7440-36-0	121.76							
Arsenic	7440-38-2	74.92							
Barium	7440-39-3	137.33							
Beryllium	7440-41-7	9.01							
Cadmium (water)	7440-43-9	112.41							
Calcium	7440-70-2	40.08							
Chromium	7440-47-3	52.00							
Cobalt	7440-48-4	58.93							
Copper	7440-50-8	63.55							
Cyanide	57-12-5	26.02	1.01E-04	7.36E-01	2.22E-03	1.28E-03	1.53E+01	9.47E+00	1.45E+02
Iron	7439-89-6	55.85							
Lead	7439-92-1	207.20							
Magnesium	7439-95-4	24.31							
Manganese (nonfood)	7439-96-5	54.94							
Mercuric chloride	7487-94-7	271.50							
Mercury	7439-97-6	200.59	1.14E-02	3.71E-01	7.99E-04	7.95E-04			
Methylmercury	22967-92-6	215.63							
Nickel	7440-02-0	58.69							
Potassium	7440-09-7	39.10							
Selenium	7782-49-2	78.96							
Silver	7440-22-4	107.87							
Sodium	7440-23-5	22.99							
Thallium	7440-28-0	204.38							
Vanadium	7440-62-2	50.94							
Zinc	7440-66-6	65.39							
Other Inorganics									
Perchlorate									
TCL Volatile Organic Compounds (VOCs)									
Acetone	67-64-1	58.08	3.88E-05	5.63E-01	1.48E-03	5.58E-04			
Benzene	71-43-2	78.11	5.55E-03	5.09E-01	1.28E-03	1.27E-03			
Bromochloromethane	74-97-5	139.38	1.46E-03	4.20E-01	9.58E-04	9.23E-04			
Bromodichloromethane	75-27-4	163.83	1.60E-03	3.98E-01	8.84E-04	8.55E-04			
Bromoform	75-25-2	252.73	5.35E-04	3.44E-01	7.12E-04	6.50E-04			
Bromomethane	74-83-9	94.94	6.24E-03	4.77E-01	1.16E-03	1.15E-03			
2-Butanone (methyl ethyl ketone)	78-93-3	72.11	5.59E-05	5.23E-01	1.33E-03	6.31E-04			
Carbon disulfide	75-15-0	76.14	3.03E-02	5.14E-01	1.30E-03	1.29E-03			
Carbon tetrachloride	56-23-5	153.82	3.04E-02	4.06E-01	9.12E-04	9.11E-04			
Chlorobenzene	108-90-7	112.56	3.70E-03	4.51E-01	1.07E-03	1.05E-03			

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Chloroethane	75-00-3	64.51	8.82E-03	5.43E-01	1.41E-03	1.40E-03			
Chloroform	67-66-3	119.38	3.67E-03	4.42E-01	1.04E-03	1.02E-03			
Chloromethane	74-87-3	50.49	8.82E-03	5.90E-01	1.59E-03	1.58E-03			
Cyclohexane	110-82-7	84.16	1.95E-01	4.97E-01	1.23E-03	1.23E-03			
1,2-Dibromo-3-chloropropane	96-12-8	236.33	1.47E-04	3.52E-01	7.36E-04	5.46E-04			
Dibromochloromethane	124-48-1	208.28	7.83E-04	3.67E-01	7.84E-04	7.35E-04			
1,2-Dibromoethane	106-93-4	187.86	7.43E-04	3.80E-01	8.25E-04	7.70E-04			
1,2-Dichlorobenzene (ortho)	95-50-1	147.00	1.90E-03	4.12E-01	9.33E-04	9.07E-04			
1,3-Dichlorobenzene (meta)	541-73-1	147.00	3.10E-03	4.12E-01	9.33E-04	9.17E-04			
1,4-Dichlorobenzene (para)	106-46-7	147.00	2.43E-03	4.12E-01	9.33E-04	9.12E-04			
Dichlorodifluoromethane	75-71-8	120.91	3.43E-01	4.40E-01	1.03E-03	1.03E-03			
1,1-Dichloroethane	75-34-3	98.96	5.62E-03	4.71E-01	1.14E-03	1.13E-03			
1,2-Dichloroethane	107-06-2	98.96	9.79E-04	4.71E-01	1.14E-03	1.07E-03			
1,1-Dichloroethene	75-35-4	96.94	2.61E-02	4.74E-01	1.15E-03	1.15E-03			
1,2-Dichloroethene (total)	540-59-0	96.94	4.51E-03	4.74E-01	1.15E-03	1.13E-03			
cis-1,2-Dichloroethene	156-59-2	96.94	4.08E-03	4.74E-01	1.15E-03	1.13E-03			
trans-1,2-Dichloroethene	156-60-5	96.94	9.38E-03	4.74E-01	1.15E-03	1.14E-03			
1,2-Dichloropropane	78-87-5	112.99	2.80E-03	4.50E-01	1.06E-03	1.04E-03			
1,3-Dichloropropene (total)	542-75-6	110.97	1.77E-02	4.53E-01	1.07E-03	1.07E-03			
cis-1,3-Dichloropropene	10061-01-5	110.97	1.20E-03	4.53E-01	1.07E-03	1.02E-03			
trans-1,3-Dichloropropene	10061-02-6	110.97	8.00E-04	4.53E-01	1.07E-03	1.00E-03			
1,4-dioxane	123-91-1	88.11	4.80E-06	4.89E-01	1.21E-03	8.90E-05			
Ethylbenzene	100-41-4	106.17	7.88E-03	4.60E-01	1.10E-03	1.09E-03			
Hexane	110-54-3	86.18	1.69E+00	4.93E-01	1.22E-03	1.22E-03			
2-Hexanone	591-78-6	100.16	9.32E-05	4.69E-01	1.13E-03	6.93E-04			
Isopropylbenzene	98-82-8	120.19	1.16E+00	4.41E-01	1.03E-03	1.03E-03			
4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1	100.16	1.38E-04	4.69E-01	1.13E-03	7.92E-04			
Methyl acetate	79-20-9	74.08	1.15E-04	5.19E-01	1.31E-03	8.54E-04			
Methyl tert-butyl ether	1634-04-4	88.15	5.87E-04	4.89E-01	1.21E-03	1.09E-03			
Methylcyclohexane	108-87-2	98.19	4.30E-01	4.72E-01	1.14E-03	1.14E-03			
Methylene chloride	75-09-2	84.93	2.19E-03	4.95E-01	1.23E-03	1.19E-03			
Styrene	100-42-5	104.15	2.75E-03	4.63E-01	1.11E-03	1.09E-03			
1,1,2,2-Tetrachloroethane	79-34-5	167.85	3.45E-04	3.94E-01	8.73E-04	7.55E-04			
Tetrachloroethene	127-18-4	165.83	1.84E-02	3.96E-01	8.79E-04	8.76E-04			
Toluene	108-88-3	92.14	6.64E-03	4.82E-01	1.18E-03	1.17E-03			
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	187.37	4.81E-01	3.80E-01	8.27E-04	8.26E-04			
1,2,3-Trichlorobenzene	87-61-6	181.45	1.25E-03	3.84E-01	8.40E-04	8.05E-04			
1,2,4-Trichlorobenzene	120-82-1	181.45	1.42E-03	3.84E-01	8.40E-04	8.09E-04			
1,1,1-Trichloroethane	71-55-6	133.40	1.72E-02	4.26E-01	9.80E-04	9.76E-04			
1,1,2-Trichloroethane	79-00-5	133.40	9.13E-04	4.26E-01	9.80E-04	9.23E-04			
Trichloroethene	79-01-6	131.39	1.03E-02	4.28E-01	9.87E-04	9.82E-04			
Trichlorofluoromethane	75-69-4	137.37	9.70E-02	4.22E-01	9.65E-04	9.65E-04			

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Vinyl Chloride	75-01-4	62.50	2.70E-02	5.49E-01	1.43E-03	1.43E-03			
Total Xylenes	1330-20-7	106.16	5.18E-03	4.60E-01	1.10E-03	1.09E-03			
Other VOCs									
n-butylbenzene	104-51-8	134.22	1.59E-02	4.25E-01	9.77E-04	9.73E-04			
sec-butylbenzene	135-98-8	134.22	1.76E-02	4.25E-01	9.77E-04	9.73E-04			
tert-butylbenzene	98-06-6	134.22	1.32E-02	4.25E-01	9.77E-04	9.72E-04			
isopropyltoluene	99-87-6	134.22	1.10E-02	4.25E-01	9.77E-04	9.72E-04			
n-propylbenzene	103-65-1	120.19	1.05E-02	4.41E-01	1.03E-03	1.03E-03			
1,1,1,2-tetrachloroethane	630-20-6	167.85	2.42E-03	3.94E-01	8.73E-04	8.54E-04			
1,2,4-trimethylbenzene	95-63-6	120.19	6.16E-03	4.41E-01	1.03E-03	1.02E-03			
1,3,5-trimethylbenzene	108-67-8	120.19	8.77E-03	4.41E-01	1.03E-03	1.03E-03			
m-xylene	108-38-3	106.17	7.34E-03	4.60E-01	1.10E-03	1.09E-03			
o-xylene	95-47-6	106.17	5.19E-03	4.60E-01	1.10E-03	1.09E-03			
p-xylene	106-42-3	106.17	7.66E-03	4.60E-01	1.10E-03	1.09E-03			
TCL Semivolatile Organic Compounds (SVOCs)									
Acenaphthene	83-32-9	154.21	1.55E-04	4.06E-01	9.11E-04	6.73E-04			
Acenaphthylene	208-96-8	152.19	1.13E-04	4.07E-01	9.17E-04	6.17E-04			
Acetophenone	98-86-2	120.15	1.07E-05	4.41E-01	1.03E-03	1.63E-04			
Anthracene	120-12-7	178.23	6.50E-05	3.86E-01	8.47E-04	4.65E-04			
Atrazine	1912-24-9	215.68	2.36E-09	3.63E-01	7.70E-04	3.50E-08			
Benzaldehyde	100-52-7	106.12	2.67E-05	4.60E-01	1.10E-03	3.45E-04			
Benzo(a)anthracene	56-55-3	228.29	3.35E-06	3.56E-01	7.49E-04	4.58E-05			
Benzo(a)pyrene	50-32-8	252.31	1.13E-06	3.44E-01	7.12E-04	1.56E-05			
Benzo(b)fluoranthene	205-99-2	252.31	1.11E-04	3.44E-01	7.12E-04	4.89E-04			
Benzo(g,h,i)perylene	191-24-2	276.33	1.41E-07	3.34E-01	6.81E-04	1.92E-06			
Benzo(k)fluoranthene	207-08-9	252.31	8.29E-07	3.44E-01	7.12E-04	1.15E-05			
1,1'-Biphenyl	92-52-4	154.21	3.00E-04	4.06E-01	9.11E-04	7.70E-04			
bis(2-Chloroethoxy)methane	111-91-1	173.04	1.70E-07	3.90E-01	8.60E-04	2.71E-06			
bis(2-chloroethyl)ether	111-44-4	143.01	1.80E-05	4.16E-01	9.46E-04	2.31E-04			
bis-(2-Ethylhexyl)phthalate	117-81-7	390.56	1.02E-07	2.97E-01	5.72E-04	1.24E-06			
4-Bromophenyl-phenylether	101-55-3	249.10	1.17E-04	3.45E-01	7.17E-04	5.00E-04			
Butylbenzylphthalate	85-68-7	312.36	1.26E-06	3.20E-01	6.40E-04	1.61E-05			
Caprolactam	105-60-2	113.16	2.53E-08	4.50E-01	1.06E-03	4.66E-07			
Carbazole	86-74-8	167.21	1.54E-08	3.95E-01	8.75E-04	2.49E-07			
4-Chloro-3-methylphenol	59-50-7	142.58	2.45E-06	4.16E-01	9.47E-04	4.00E-05			
4-Chloroaniline	106-47-8	127.57	3.31E-07	4.32E-01	1.00E-03	5.82E-06			
2-Chloronaphthalene	91-58-7	162.62	3.14E-04	3.98E-01	8.87E-04	7.56E-04			
2-Chlorophenol	95-57-8	128.56	3.91E-04	4.31E-01	9.98E-04	8.72E-04			
4-Chlorophenyl-phenylether	7005-72-3	204.65	9.00E-05	3.69E-01	7.91E-04	5.00E-04			
Chrysene	218-01-9	228.29	9.46E-05	3.56E-01	7.49E-04	4.85E-04			
Di-n-butylphthalate	84-74-2	278.34	9.38E-10	3.33E-01	6.78E-04	1.28E-08			
Di-n-octylphthalate	117-84-0	390.56	6.68E-05	2.97E-01	5.72E-04	3.36E-04			

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Dibenzo(a,h)anthracene	53-70-3	278.35	1.47E-08	3.33E-01	6.78E-04	2.00E-07			
Dibenzofuran	132-64-9	168.19	1.26E-05	3.94E-01	8.72E-04	1.65E-04			
3,3'-Dichlorobenzidine	91-94-1	253.13	4.00E-09	3.44E-01	7.11E-04	5.62E-08			
2,4-Dichlorophenol	120-83-2	163.00	3.16E-06	3.98E-01	8.86E-04	4.87E-05			
Diethylphthalate	84-66-2	222.24	4.50E-07	3.59E-01	7.59E-04	6.55E-06			
2,4-Dimethylphenol	105-67-9	122.16	2.00E-06	4.39E-01	1.02E-03	3.47E-05			
Dimethylphthalate	131-11-3	194.18	1.05E-07	3.76E-01	8.12E-04	1.61E-06			
4,6-Dinitro-2-methylphenol	534-52-1	198.13	4.27E-07	3.73E-01	8.04E-04	6.47E-06			
2,4-Dinitrophenol	51-28-5	184.11	4.43E-07	3.82E-01	8.34E-04	6.87E-06			
2,4-Dinitrotoluene	121-14-2	182.13	9.26E-08	3.84E-01	8.38E-04	1.45E-06			
2,6-Dinitrotoluene	606-20-2	182.13	7.47E-07	3.84E-01	8.38E-04	1.16E-05			
Fluoranthene	206-44-0	202.25	1.61E-05	3.70E-01	7.96E-04	1.87E-04			
Fluorene	86-73-7	166.22	6.36E-05	3.96E-01	8.78E-04	4.74E-04			
Hexachlorobenzene	118-74-1	284.78	1.32E-03	3.30E-01	6.70E-04	6.46E-04			
Hexachlorobutadiene	87-68-3	260.76	8.15E-03	3.40E-01	7.01E-04	6.96E-04			
Hexachlorocyclopentadiene	77-47-4	272.77	2.70E-02	3.35E-01	6.85E-04	6.84E-04			
Hexachloroethane	67-72-1	236.74	3.89E-03	3.51E-01	7.35E-04	7.26E-04			
Indeno(1,2,3-cd)pyrene	193-39-5	276.33	1.60E-06	3.34E-01	6.81E-04	2.12E-05			
Isophorone	78-59-1	138.21	6.64E-06	4.21E-01	9.62E-04	1.02E-04			
2-Methylnaphthalene	91-57-6	142.20	5.18E-04	4.17E-01	9.49E-04	8.57E-04			
2-Methylphenol	95-48-7	108.14	1.20E-06	4.57E-01	1.09E-03	2.20E-05			
3-Methylphenol	108-39-4	108.14	8.65E-07	4.57E-01	1.09E-03	1.59E-05			
4-Methylphenol	106-44-5	108.14	7.92E-07	4.57E-01	1.09E-03	1.46E-05			
N-Nitroso-di-n-propylamine	621-64-7	130.19	2.25E-06	4.29E-01	9.92E-04	3.80E-05			
N-Nitrosodiphenylamine	86-30-6	198.22	5.00E-06	3.73E-01	8.04E-04	6.97E-05			
Naphthalene	91-20-3	128.17	4.83E-04	4.32E-01	9.99E-04	8.95E-04			
2-Nitroaniline	88-74-4	138.12	1.09E-07	4.21E-01	9.63E-04	1.87E-06			
3-Nitroaniline	99-09-2	138.12	1.44E-07	4.21E-01	9.63E-04	2.47E-06			
4-Nitroaniline	100-01-6	138.12	2.07E-09	4.21E-01	9.63E-04	3.57E-08			
Nitrobenzene	98-95-3	123.11	2.40E-05	4.37E-01	1.02E-03	3.02E-04			
2-Nitrophenol	88-75-5	139.11	9.47E-06	4.20E-01	9.59E-04	1.39E-04			
4-Nitrophenol	100-02-7	139.11	4.15E-10	4.20E-01	9.59E-04	7.13E-09			
2,2'-Oxybis(1-chloropropane)	108-60-1	171.06	1.17E-04	3.92E-01	8.65E-04	5.92E-04			
Pentachlorophenol	87-86-5	266.34	2.44E-08	3.38E-01	6.93E-04	3.37E-07			
Phenanthrene	85-01-8	178.23	2.33E-05	3.86E-01	8.47E-04	2.57E-04			
Phenol	108-95-2	94.11	3.97E-07	4.79E-01	1.17E-03	7.72E-06			
Pyrene	129-00-0	202.25	1.10E-05	3.70E-01	7.96E-04	1.38E-04			
1,2,4,5-Tetrachlorobenzene	95-94-3	215.89	2.58E-03	3.62E-01	7.70E-04	7.55E-04			
2,3,4,6-Tetrachlorophenol	58-90-2	231.89	4.39E-06	3.54E-01	7.43E-04	5.86E-05			
2,4,5-Trichlorophenol	95-95-4	197.45	4.33E-06	3.73E-01	8.05E-04	6.11E-05			
2,4,6-Trichlorophenol	88-06-2	197.45	7.79E-06	3.73E-01	8.05E-04	1.04E-04			
Other SVOCs									

Table 3.8 Exposure-point concentrations (inhalation) for construction/utility workers in a trench: Groundwater less than 15 feet deep revised 10/5/07	CAS No.	Molecular Weight MWi g/mol	Henry's Law Constant Hi atm-m3/mol	Gas-Phase Mass Transfer Coefficient KiG cm/s	Liquid-Phase Mass Transfer Coefficient KiL cm/s	Overall Mass Transfer Coefficient Ki cm/s	Concentration of Contaminant in Groundwater Cgw ug/L	Volatilization Factor VF L/m3	Concentration of Contaminant in Trench Ctrench ug/m3
Benzoic acid	65-85-0	122.12	3.81E-08	4.39E-01	1.02E-03	6.83E-07			
TCL Polychlorinated Biphenyls (PCBs)									
Aroclor-1016	12674-11-2	257.90	2.90E-04	3.41E-01	7.04E-04	6.00E-04			
Aroclor-1221	11104-28-2	200.70	3.50E-03	3.71E-01	7.99E-04	7.87E-04			
Aroclor-1232	11141-16-5	232.20	7.36E-04	3.54E-01	7.42E-04	6.94E-04			
Aroclor-1242	53469-21-9	266.50	5.20E-04	3.38E-01	6.93E-04	6.32E-04			
Aroclor-1248	12672-29-6	299.50	2.80E-03	3.25E-01	6.54E-04	6.42E-04			
Aroclor-1254	11097-69-1	328.00	2.00E-03	3.15E-01	6.25E-04	6.10E-04			
Aroclor-1260	11096-82-5	375.70	4.60E-03	3.01E-01	5.84E-04	5.78E-04			
Aroclor-1262	37324-23-5	389.00	4.60E-03	2.98E-01	5.74E-04	5.68E-04			
Aroclor-1268	11100-14-4	453.00	4.60E-03	2.83E-01	5.32E-04	5.26E-04			
Total PCBs	1336-36-3								
TCL Pesticides									
Aldrin	309-00-2	364.91	1.70E-04	3.04E-01	5.92E-04	4.63E-04			
alpha-BHC	319-84-6	290.83	1.06E-05	3.28E-01	6.63E-04	1.17E-04			
beta-BHC	319-85-7	290.83	7.43E-07	3.28E-01	6.63E-04	9.82E-06			
delta-BHC	319-86-8	290.83	4.29E-07	3.28E-01	6.63E-04	5.71E-06			
gamma-BHC (lindane)	58-89-9	290.83	1.40E-05	3.28E-01	6.63E-04	1.46E-04			
Chlordane	57-74-9	409.78	4.86E-05	2.92E-01	5.59E-04	2.85E-04			
alpha-Chlordane	5103-71-9	409.76	4.86E-05	2.92E-01	5.59E-04	2.85E-04			
gamma-Chlordane	5103-74-2	409.76	4.86E-05	2.92E-01	5.59E-04	2.85E-04			
4,4'-DDD	72-54-8	320.04	4.00E-06	3.18E-01	6.32E-04	4.80E-05			
4,4'-DDE	72-55-9	318.02	2.10E-05	3.18E-01	6.34E-04	1.91E-04			
4,4'-DDT	50-29-3	354.48	8.10E-06	3.07E-01	6.01E-04	8.70E-05			
Dieldrin	60-57-1	380.91	1.51E-05	3.00E-01	5.80E-04	1.40E-04			
Endosulfan	115-29-7	406.92	1.12E-05	2.93E-01	5.61E-04	1.08E-04			
Endosulfan I	959-98-8	406.92	6.50E-05	2.93E-01	5.61E-04	3.26E-04			
Endosulfan II	33213-65-9	406.92	6.50E-05	2.93E-01	5.61E-04	3.26E-04			
Endosulfan Sulfate	1031-07-8	422.92	3.25E-07	2.89E-01	5.50E-04	3.82E-06			
Endrin	72-20-8	380.91	7.52E-06	3.00E-01	5.80E-04	7.96E-05			
Endrin Aldehyde	7421-93-4	380.91	4.18E-06	3.00E-01	5.80E-04	4.71E-05			
Endrin Ketone	53494-70-5	380.90	1.25E-05	3.00E-01	5.80E-04	1.21E-04			
Heptachlor	76-44-8	373.32	1.09E-03	3.02E-01	5.86E-04	5.61E-04			
Heptachlor epoxide	1024-57-3	389.32	9.50E-06	2.97E-01	5.73E-04	9.62E-05			
Methoxychlor	72-43-5	345.65	1.58E-05	3.10E-01	6.09E-04	1.51E-04			
Toxaphene	8001-35-2	414.00	6.00E-06	2.91E-01	5.56E-04	6.34E-05			

ATTACHMENT D

LEAD MODEL TABLES AND FIGURES

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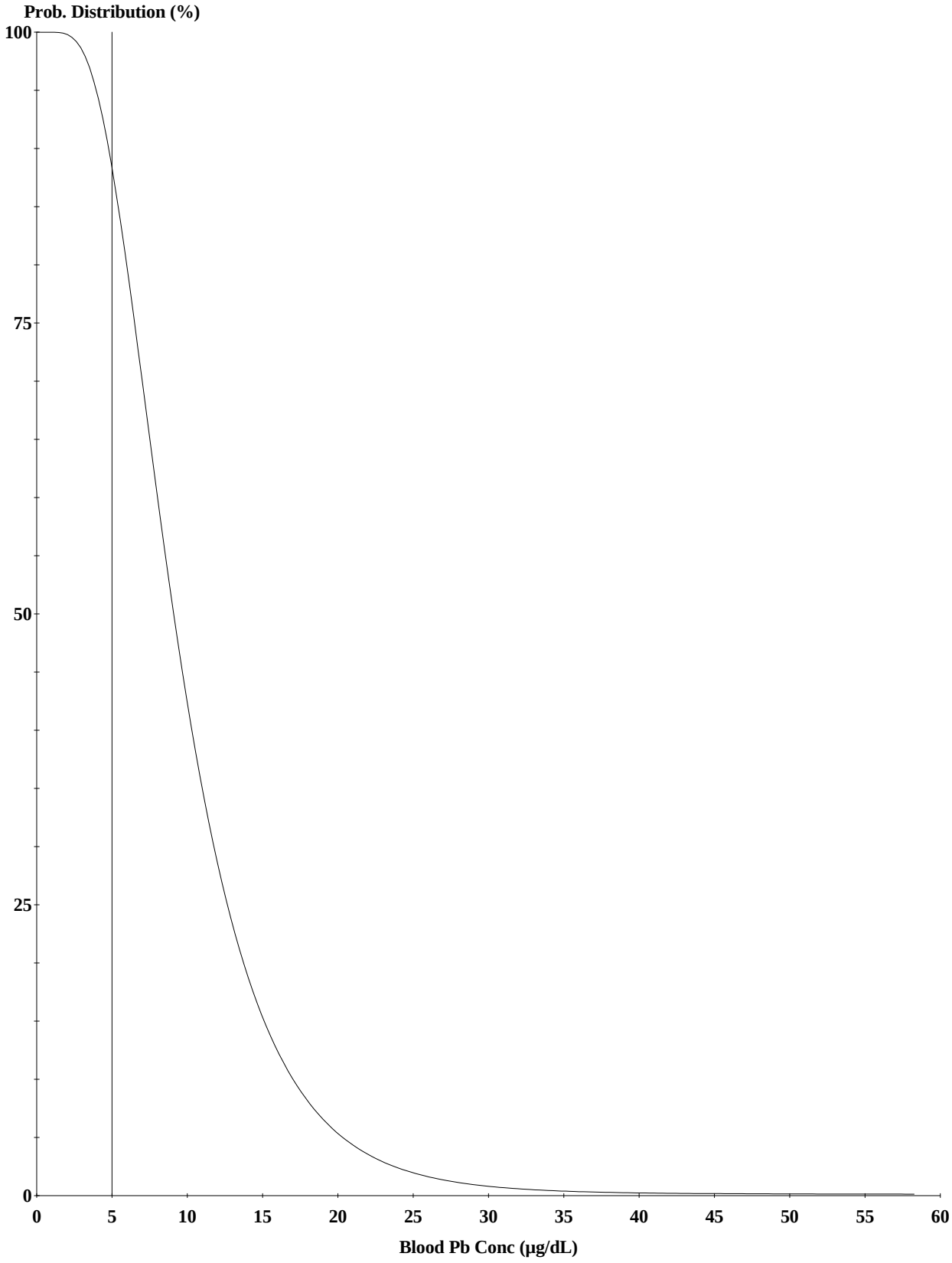

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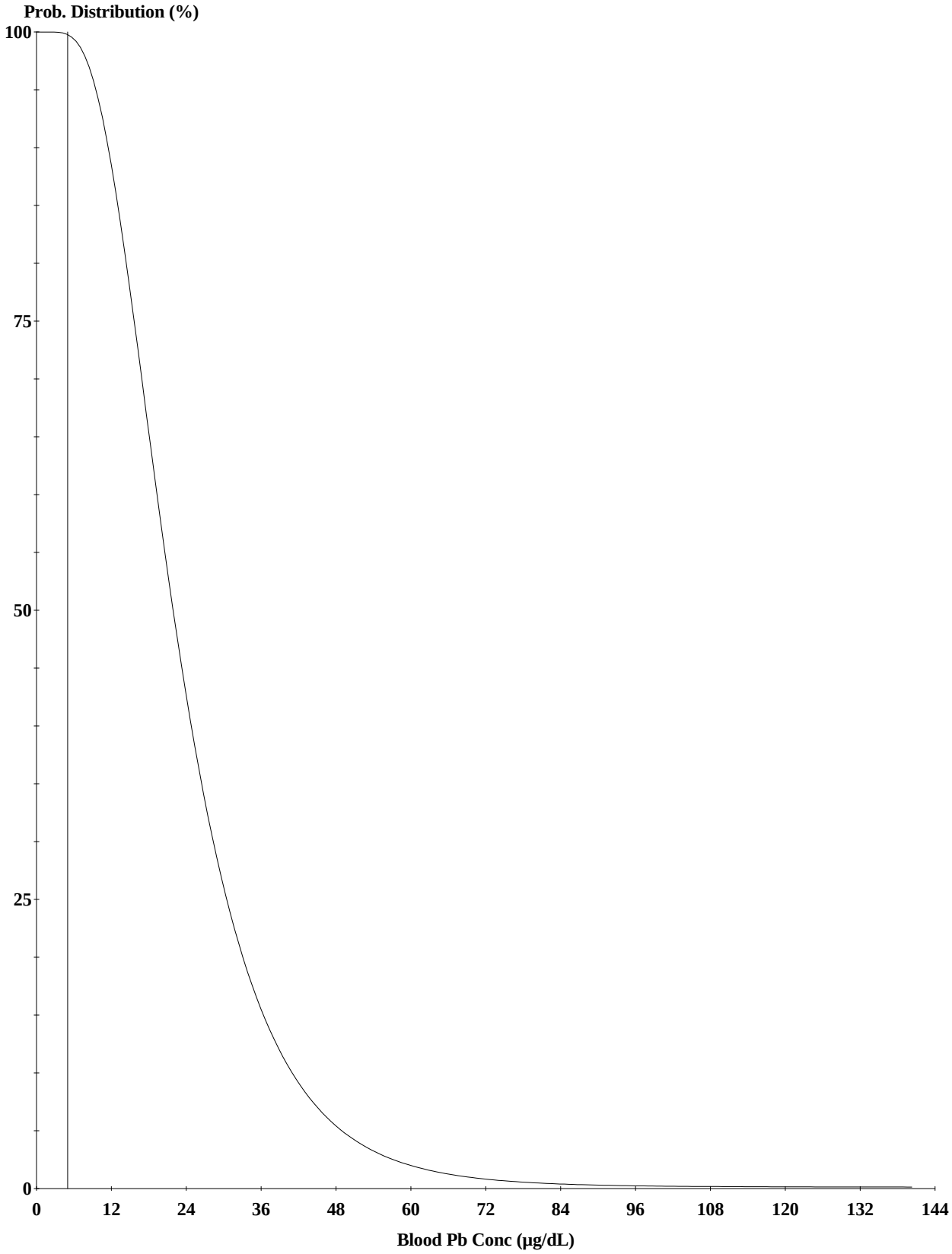
GSD = 1.600
% Above = 91.505

Age Range = 0 to 84 months

Run Mode = Research



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GSD = 1.600
% Above = 99.941

Age Range = 0 to 84 months

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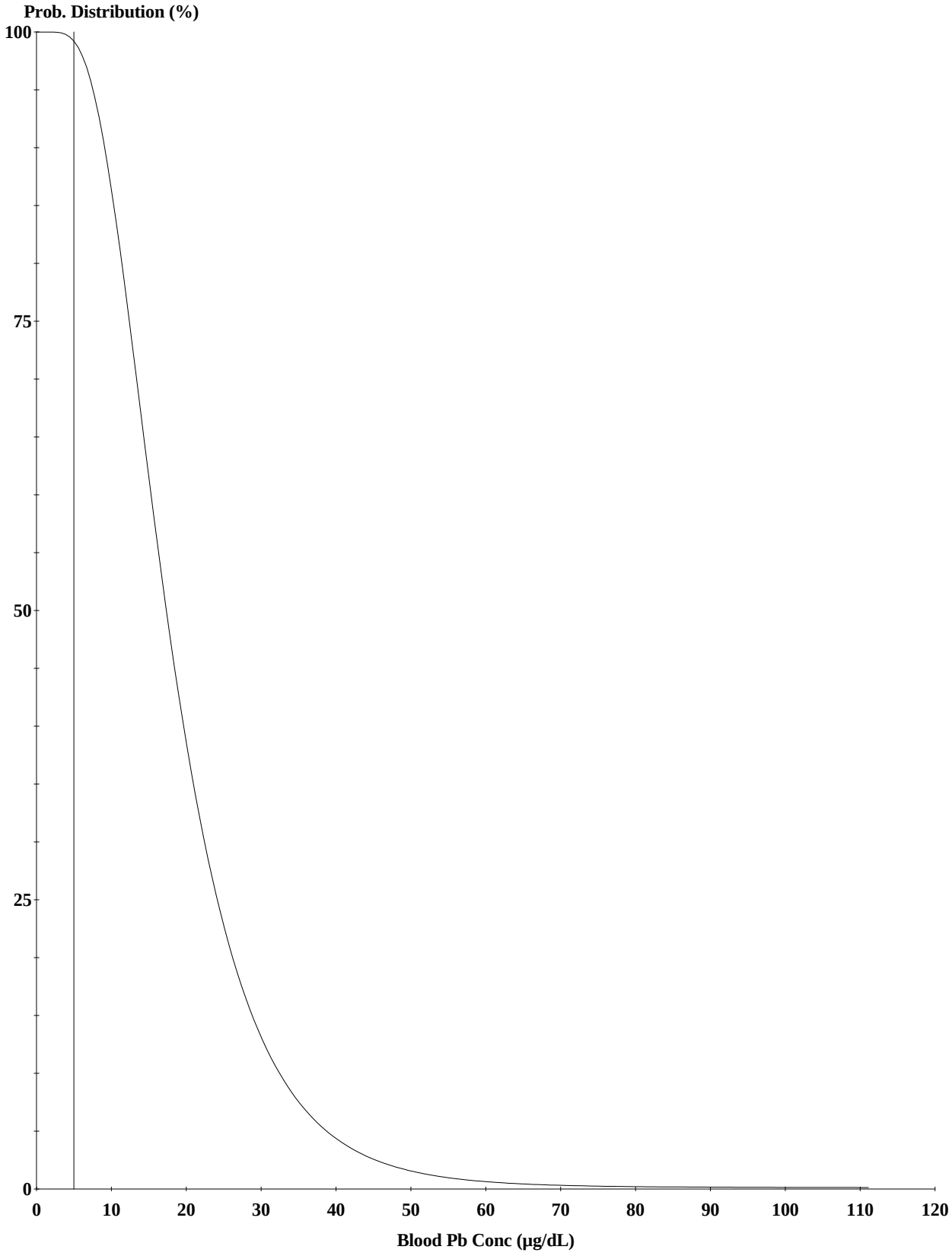

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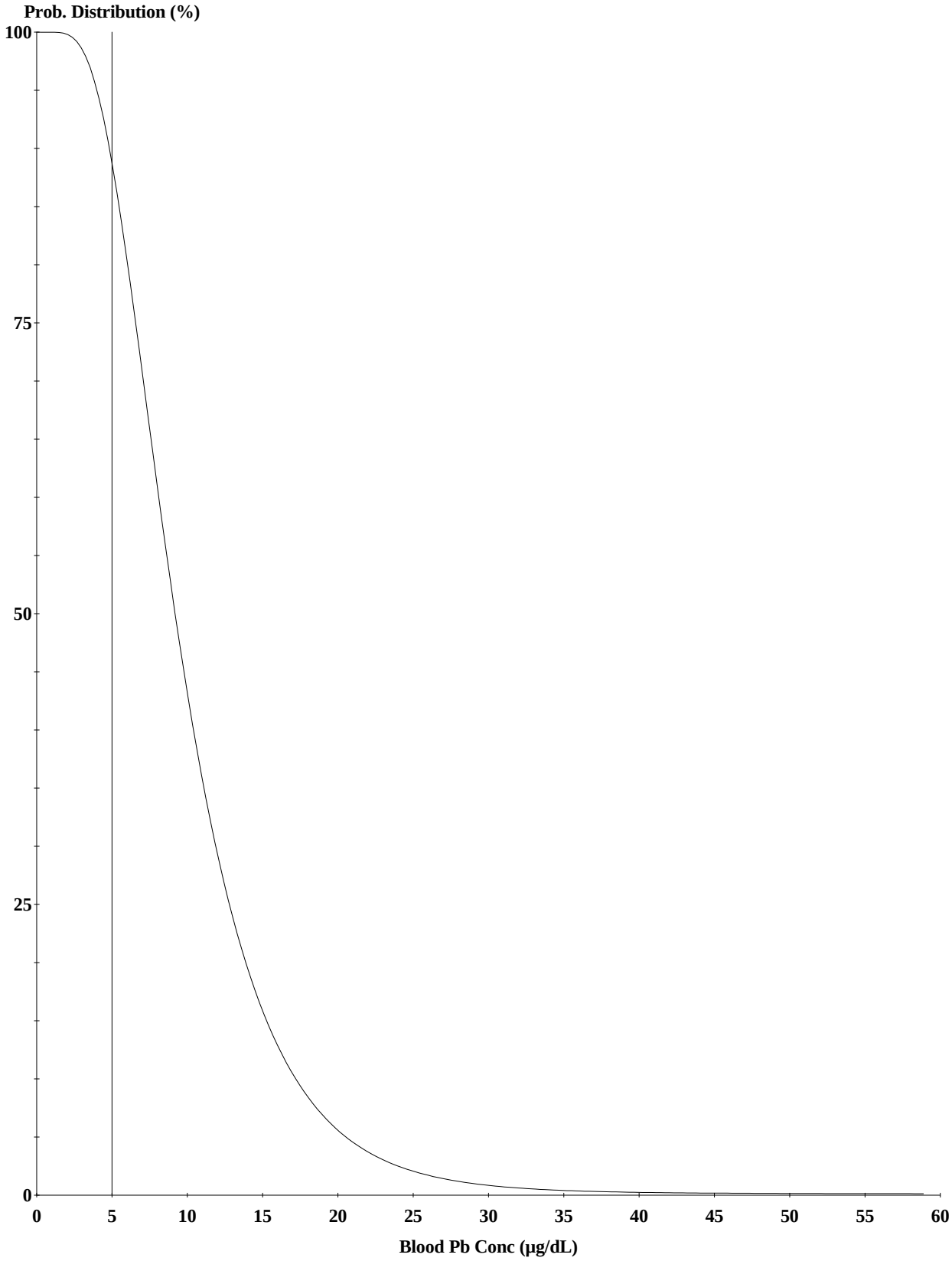
% Above = 99.698

Age Range = 0 to 84 months

Run Mode = Research



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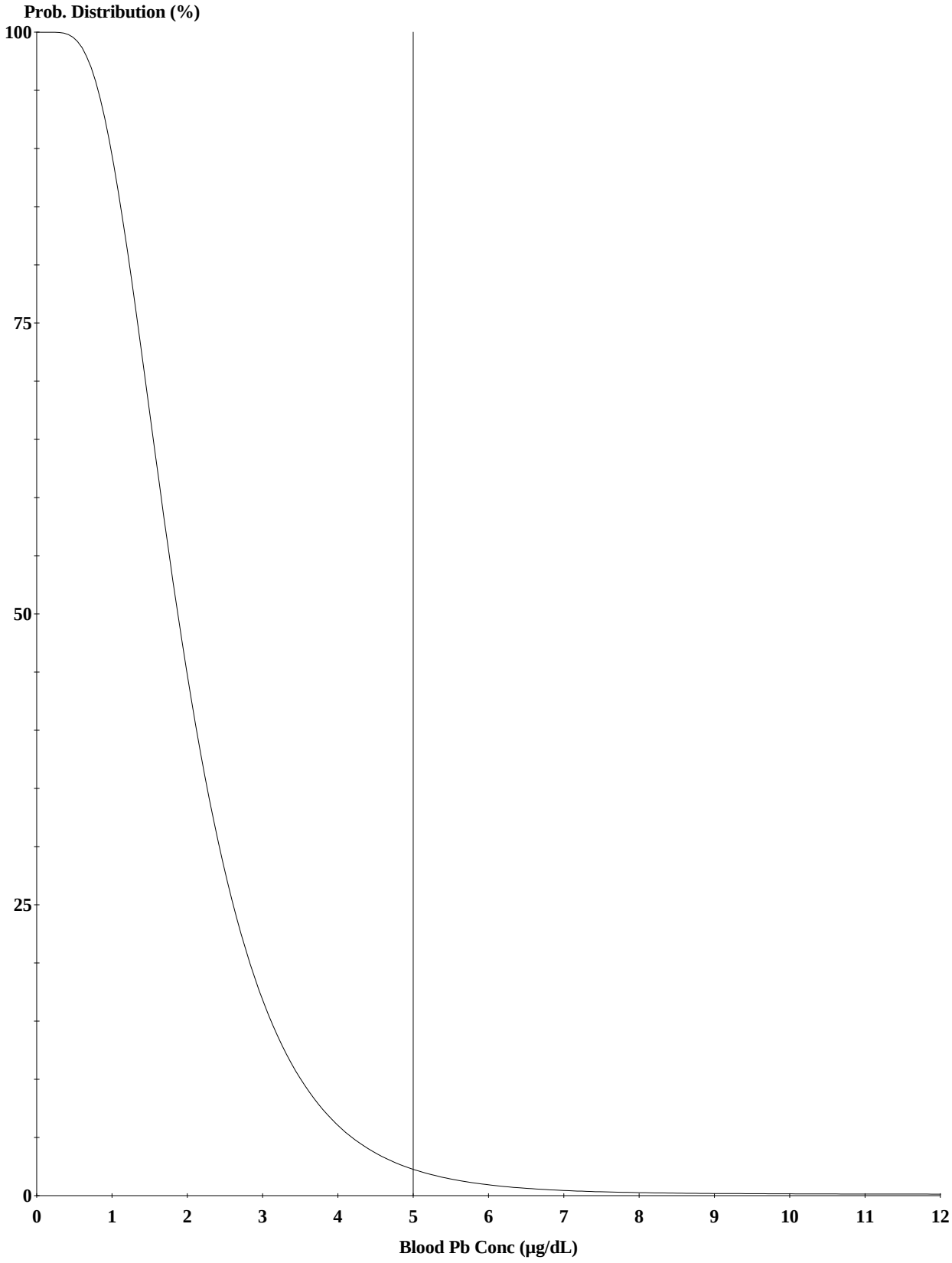
GSD = 1.600
% Above = 91.849

Age Range = 0 to 84 months

Run Mode = Research



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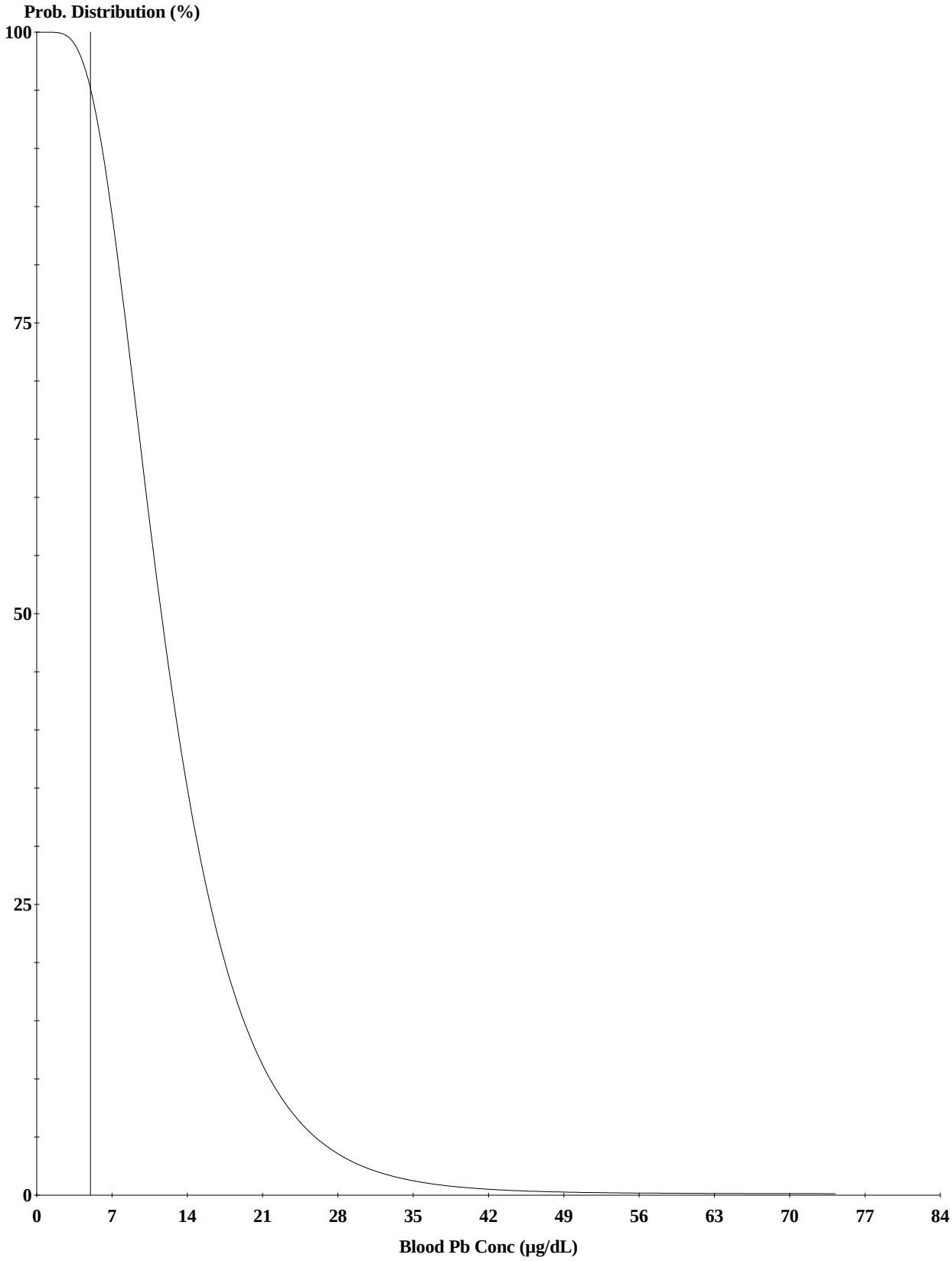
Geo Mean = 1.964
GSD = 1.600
% Above = 2.339

Age Range = 0 to 84 months

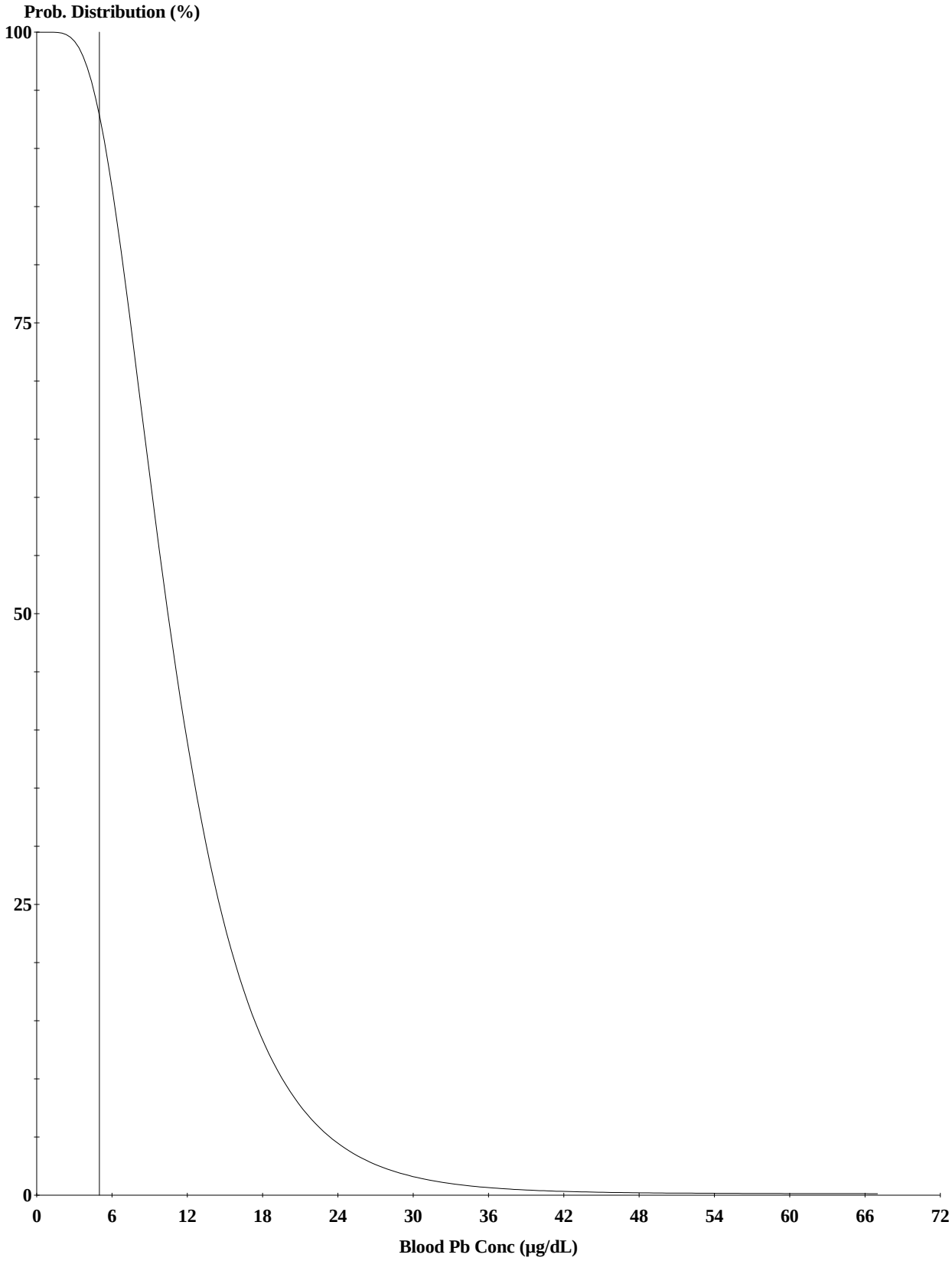
Run Mode = Research



Cutoff = 5.000 µg/dl
Geo Mean = 12.143
GSD = 1.600
% Above = 97.048

Age Range = 0 to 84 months

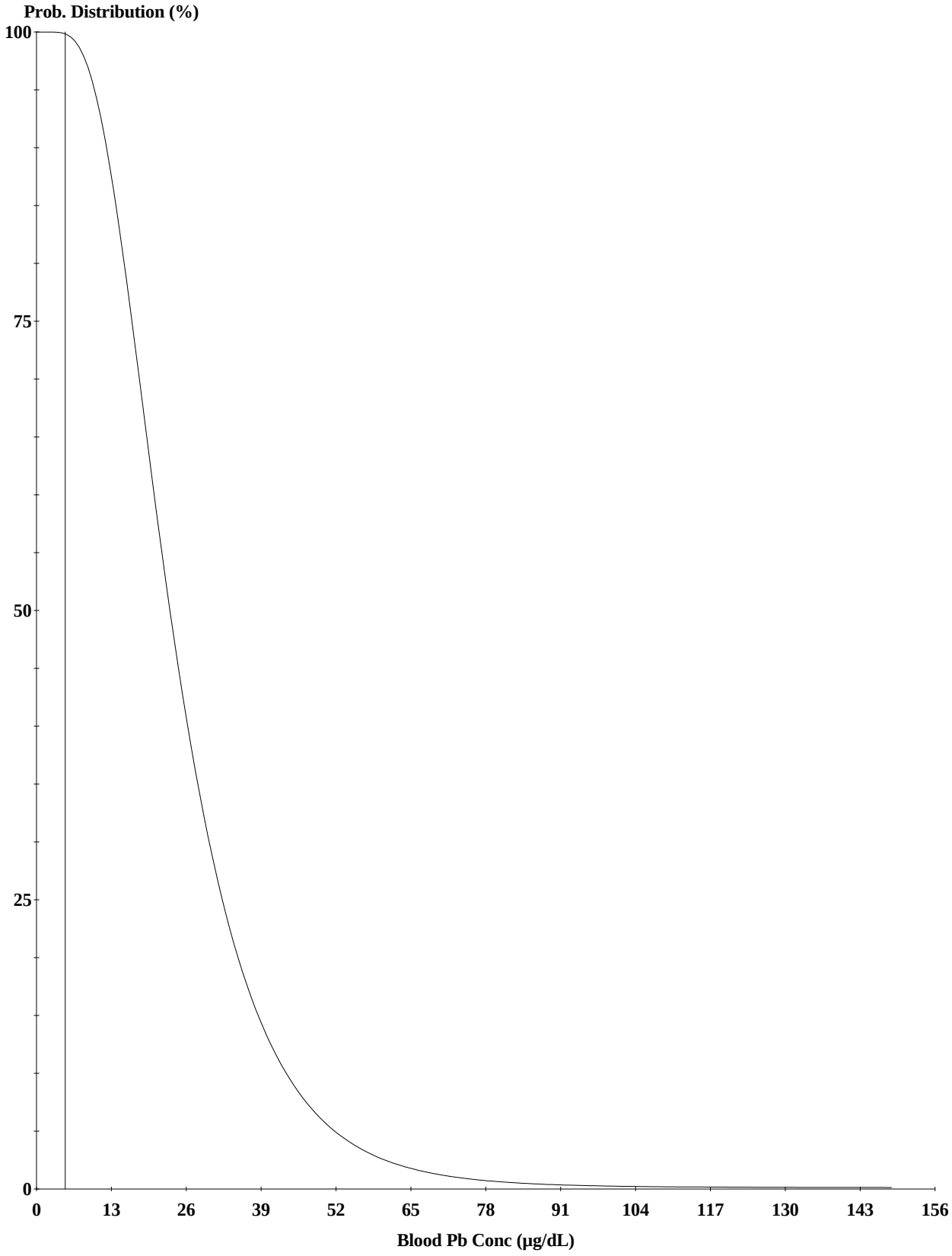
Run Mode = Research



Cutoff = 5.000 µg/dl
Geo Mean = 10.960
GSD = 1.600
% Above = 95.251

Age Range = 0 to 84 months

Run Mode = Research



Cutoff = 5.000 µg/dl
Geo Mean = 24.282
GSD = 1.600
% Above = 99.961

Age Range = 0 to 84 months

Run Mode = Research

ATTACHMENT E

NONDETECT SCREENING TABLES

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TABLE E.1
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE, COMBINED SURFACE SOIL AND SUBSURFACE SOIL

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Human Health Screening Toxicity Value [2]	Ratio of Screening Concentration to Human Health Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	8.10E+02	1.4E-05
79-34-5	1,1,2,2-TETRACHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	6.00E-01	1.9E-02
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	6.70E+02	1.7E-05
79-00-5	1,1,2-TRICHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.50E-01	7.7E-02
75-34-3	1,1-DICHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	3.60E+00	3.2E-03
75-35-4	1,1-DICHLOROETHYLENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	2.30E+01	5.0E-04
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**mg/kg**	**4.50E-03**	**2.30E-02**	**1.15E-02**	**5.30E-03**	**2.2E+00**
106-93-4	1,2-DIBROMOETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	3.60E-02	3.2E-01
107-06-2	1,2-DICHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	4.60E-01	2.5E-02
78-87-5	1,2-DICHLOROPROPANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	2.80E-01	4.1E-02
591-78-6	2-HEXANONE	mg/kg	9.00E-03	4.50E-02	2.25E-02	2.00E+01	1.1E-03
75-27-4	BROMODICHLOROMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	2.90E-01	4.0E-02
75-25-2	BROMOFORM	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.90E+01	6.1E-04
74-83-9	BROMOMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	6.80E-01	1.7E-02
56-23-5	CARBON TETRACHLORIDE	mg/kg	4.50E-03	2.30E-02	1.15E-02	6.50E-01	1.8E-02
74-97-5	CHLOROBROMOMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.50E+01	7.7E-04
75-00-3	CHLOROETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.40E+03	8.2E-06
67-66-3	CHLOROFORM	mg/kg	4.50E-03	2.30E-02	1.15E-02	3.20E-01	3.6E-02
74-87-3	CHLOROMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.10E+01	1.0E-03
156-59-2	CIS-1,2-DICHLOROETHENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.60E+01	7.2E-04
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.80E+00 [3]	6.4E-03
124-48-1	DIBROMOCHLOROMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	8.30E+00	1.4E-03
75-71-8	DICHLORODIFLUOROMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	8.70E+00	1.3E-03
127-18-4	TETRACHLOROETHYLENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	8.10E+00	1.4E-03
156-60-5	TRANS-1,2-DICHLOROETHENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.60E+02	7.2E-05
10061-02-6	TRANS-1,3-DICHLOROPROPENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	1.80E+00 [3]	6.4E-03
79-01-6	TRICHLOROETHYLENE	mg/kg	4.50E-03	2.30E-02	1.15E-02	4.10E-01	2.8E-02
75-69-4	TRICHLOROFLUOROMETHANE	mg/kg	4.50E-03	2.30E-02	1.15E-02	2.30E+03	5.0E-06
75-01-4	VINYL CHLORIDE	mg/kg	4.50E-03	2.30E-02	1.15E-02	5.90E-02	1.9E-01
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	3.50E-01	2.00E+00	1.00E+00	3.10E+02	3.2E-03
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	1.80E-01	1.00E+00	5.00E-01	6.30E+00	7.9E-02
91-58-7	2-CHLORONAPHTHALENE	mg/kg	1.80E-01	1.00E+00	5.00E-01	4.80E+02	1.0E-03
88-75-5	2-NITROPHENOL	mg/kg	1.80E-01	1.00E+00	5.00E-01	NV	N/A
91-94-1	3,3'-DICHLOROBENZIDINE	mg/kg	3.50E-01	2.00E+00	1.00E+00	1.20E+00	8.3E-01
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	1.80E-01	1.00E+00	5.00E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	1.80E-01	1.00E+00	5.00E-01	6.30E+02	7.9E-04
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	1.80E-01	1.00E+00	5.00E-01	NV	N/A
100-01-6	4-NITROANILINE	mg/kg	3.50E-01	9.50E-01	4.75E-01	2.50E+01	1.9E-02

TABLE E.1
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE, COMBINED SURFACE SOIL AND SUBSURFACE SOIL

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Human Health Screening Toxicity Value [2]	Ratio of Screening Concentration to Human Health Screening Value
100-02-7	4-NITROPHENOL	mg/kg	3.50E-01	9.50E-01	4.75E-01	NV	N/A
1912-24-9	ATRAZINE	mg/kg	3.50E-01	2.00E+00	1.00E+00	2.40E+00	4.2E-01
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	1.80E-01	1.00E+00	5.00E-01	1.90E+01	2.6E-02
111-44-4	**BIS(2-CHLOROETHYL)ETHER**	**mg/kg**	**3.50E-01**	**2.00E+00**	**1.00E+00**	**2.30E-01**	**4.3E+00**
87-68-3	HEXACHLOROBUTADIENE	mg/kg	1.80E-01	1.00E+00	5.00E-01	1.20E+00	4.2E-01
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**mg/kg**	**3.50E-01**	**2.00E+00**	**1.00E+00**	**1.80E-01**	**5.6E+00**
67-72-1	HEXACHLOROETHANE	mg/kg	1.80E-01	1.00E+00	5.00E-01	1.80E+00	2.8E-01
78-59-1	ISOPHORONE	mg/kg	1.80E-01	1.00E+00	5.00E-01	5.70E+02	8.8E-04
98-95-3	NITROBENZENE	mg/kg	1.80E-01	1.00E+00	5.00E-01	5.10E+00	9.8E-02
621-64-7	**N-NITROSODI-N-PROPYLAMINE**	**mg/kg**	**1.80E-01**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.4E+00**
87-86-5	PENTACHLOROPHENOL	mg/kg	3.50E-01	2.00E+00	1.00E+00	1.00E+00	1.0E+00
8001-35-2	**TOXAPHENE**	**mg/kg**	**9.40E-02**	**1.00E+00**	**5.00E-01**	**4.90E-01**	**1.0E+00**
12674-11-2	**AROCLOR-1016**	**mg/kg**	**3.50E-02**	**2.00E+00**	**1.00E+00**	**4.10E-01**	**2.4E+00**
11104-28-2	**AROCLOR-1221**	**mg/kg**	**3.50E-02**	**2.00E+00**	**1.00E+00**	**2.00E-01**	**5.0E+00**
11141-16-5	**AROCLOR-1232**	**mg/kg**	**3.50E-02**	**2.00E+00**	**1.00E+00**	**1.70E-01**	**5.9E+00**
53469-21-9	**AROCLOR-1242**	**mg/kg**	**3.50E-02**	**2.00E+00**	**1.00E+00**	**2.30E-01**	**4.3E+00**
37324-23-5	**AROCLOR-1262**	**mg/kg**	**3.50E-02**	**2.00E+00**	**1.00E+00**	**2.40E-01 [4]**	**4.2E+00**
118-96-7	2,4,6-TRINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.60E+00	3.5E-02
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	1.50E+01	8.3E-03
88-72-2	2-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.20E+00	3.9E-02
99-08-1	3-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.30E-01	2.0E-01
99-99-0	4-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	2.50E+01	5.0E-03
99-65-0	M-DINITROBENZENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.30E-01	2.0E-01
2691-41-0	OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE (HMX)	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.90E+02	3.2E-04
121-82-4	RDX	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.10E+00	2.0E-02
10098-97-2	STRONTIUM-90	pCi/g	3.00E+00	3.00E+00	1.50E+00	3.13E+00	4.8E-01

[1] Set at 1/2 maximum CRQL
[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-06, non-cancer HQ = 0.1)
[3] RSL for unspecified 1,3-dichloropropene
[4] RSL for Aroclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable
LANL = Los Alamos National Laboratory EcoRisk Database Version 4.1
Eco-SSL = Ecological Soil Screening Level
EPA = U.S. Environmental Protection Agency

TABLE E.2
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	8.10E+03	4.14E-07
79-34-5	1,1,2,2-TETRACHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.00E+00	5.58E-04
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.70E+03	5.00E-07
79-00-5	1,1,2-TRICHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.50E+00	2.23E-03
75-34-3	1,1-DICHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	3.60E+01	9.31E-05
75-35-4	1,1-DICHLOROETHYLENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.30E+02	1.46E-05
87-61-6	1,2,3-TRICHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.30E+01	5.32E-05
120-82-1	1,2,4-TRICHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	5.80E+01	5.78E-05
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	mg/kg	5.60E-03	6.70E-03	3.35E-03	5.30E-02	6.32E-02
106-93-4	1,2-DIBROMOETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	3.60E-01	9.31E-03
95-50-1	1,2-DICHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.80E+03	1.86E-06
107-06-2	1,2-DICHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	4.60E+00	7.28E-04
78-87-5	1,2-DICHLOROPROPANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.80E+00	1.20E-03
541-73-1	1,3-DICHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	NV	N/A
106-46-7	1,4-DICHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.60E+01	1.29E-04
78-93-3	2-BUTANONE	mg/kg	1.10E-02	1.30E-02	6.50E-03	2.70E+04	2.41E-07
591-78-6	2-HEXANONE	mg/kg	1.10E-02	1.30E-02	6.50E-03	2.00E+02	3.25E-05
108-10-1	4-METHYL-2-PENTANONE	mg/kg	1.10E-02	1.30E-02	6.50E-03	3.30E+04	1.97E-07
67-64-1	ACETONE	mg/kg	1.10E-02	1.30E-02	6.50E-03	6.10E+04	1.07E-07
71-43-2	BENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.20E+01	2.79E-04
75-27-4	BROMODICHLOROMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.90E+00	1.16E-03
75-25-2	BROMOFORM	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.90E+02	1.76E-05
74-83-9	BROMOMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.80E+00	4.93E-04
75-15-0	CARBON DISULFIDE	mg/kg	5.60E-03	6.70E-03	3.35E-03	7.70E+02	4.35E-06
56-23-5	CARBON TETRACHLORIDE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.50E+00	5.15E-04
108-90-7	CHLOROBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.80E+02	1.20E-05
74-97-5	CHLOROBROMOMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.50E+02	2.23E-05
75-00-3	CHLOROETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.40E+04	2.39E-07
67-66-3	CHLOROFORM	mg/kg	5.60E-03	6.70E-03	3.35E-03	3.20E+00	1.05E-03
74-87-3	CHLOROMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.10E+02	3.05E-05
156-59-2	CIS-1,2-DICHLOROETHENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.60E+02	2.09E-05
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.80E+01 [3]	1.86E-04

TABLE E.2
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
110-82-7	CYCLOHEXANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.50E+03	5.15E-07
124-48-1	DIBROMOCHLOROMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	8.30E+01	4.04E-05
75-71-8	DICHLORODIFLUOROMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	8.70E+01	3.85E-05
100-41-4	ETHYLBENZENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	5.80E+01	5.78E-05
98-82-8	ISOPROPYLBENZENE (CUMENE)	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.90E+03	1.76E-06
179601-23-1	m,p-Xylene	mg/kg	5.60E-03	6.70E-03	3.35E-03	5.50E+02 [4]	6.09E-06
79-20-9	METHYL ACETATE	mg/kg	5.60E-03	6.70E-03	3.35E-03	7.80E+04	4.29E-08
1634-04-4	METHYL TERT-BUTYL ETHER	mg/kg	5.60E-03	6.70E-03	3.35E-03	4.70E+02	7.13E-06
108-87-2	METHYLCYLOHEXANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	NV	N/A
75-09-2	METHYLENE CHLORIDE	mg/kg	5.60E-03	6.70E-03	3.35E-03	3.50E+02	9.57E-06
95-47-6	o-Xylene	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.50E+02	5.15E-06
100-42-5	STYRENE (MONOMER)	mg/kg	5.60E-03	6.70E-03	3.35E-03	6.00E+03	5.58E-07
127-18-4	TETRACHLOROETHYLENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	8.10E+01	4.14E-05
108-88-3	TOLUENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	4.90E+03	6.84E-07
156-60-5	TRANS-1,2-DICHLOROETHENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.60E+03	2.09E-06
10061-02-6	TRANS-1,3-DICHLOROPROPENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	1.80E+01 [3]	1.86E-04
79-01-6	TRICHLOROETHYLENE	mg/kg	5.60E-03	6.70E-03	3.35E-03	4.10E+00	8.17E-04
75-69-4	TRICHLOROFLUOROMETHANE	mg/kg	5.60E-03	6.70E-03	3.35E-03	2.30E+04	1.46E-07
75-01-4	VINYL CHLORIDE	mg/kg	5.60E-03	6.70E-03	3.35E-03	5.90E-01	5.68E-03
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	2.30E+01	7.61E-03
123-91-1	1,4-DIOXANE	mg/kg	8.00E-02	1.30E-01	6.50E-02	5.30E+01	1.23E-03
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	4.00E-01	6.70E-01	3.35E-01	3.10E+03	1.08E-04
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.90E+03	9.21E-05
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	6.30E+03	2.78E-05
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	6.30E+01	2.78E-03
120-83-2	2,4-DICHLOROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.90E+02	9.21E-04
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.30E+03	1.35E-04
51-28-5	2,4-DINITROPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.30E+02	2.58E-03
121-14-2	2,4-DINITROTOLUENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.70E+01	1.03E-02
606-20-2	2,6-DINITROTOLUENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	3.60E+00	4.86E-02
91-58-7	2-CHLORONAPHTHALENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	4.80E+03	3.65E-05
95-57-8	2-CHLOROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	3.90E+02	4.49E-04

TABLE E.2
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
95-48-7	2-METHLYPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	3.20E+03	1.05E-04
91-57-6	2-METHYLNAPHTHALENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	2.40E+02	7.29E-04
88-74-4	2-NITROANILINE	mg/kg	2.10E-01	3.50E-01	1.75E-01	6.30E+02	2.78E-04
88-75-5	2-NITROPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A
91-94-1	3,3'-DICHLOROBENZIDINE	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.20E+01	2.79E-02
99-09-2	3-NITROANILINE	mg/kg	4.00E-01	6.70E-01	3.35E-01	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	5.10E+00	6.57E-02
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	2.10E-01	3.50E-01	1.75E-01	6.30E+03	2.78E-05
106-47-8	4-CHLOROANILINE	mg/kg	4.00E-01	6.70E-01	3.35E-01	2.70E+01	1.24E-02
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	6.30E+03	5.32E-05
100-01-6	4-NITROANILINE	mg/kg	4.00E-01	6.70E-01	3.35E-01	2.50E+02	1.34E-03
100-02-7	4-NITROPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	NV	N/A
83-32-9	ACENAPHTHENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	3.60E+03	4.86E-05
208-96-8	ACENAPHTHYLENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A
98-86-2	ACETOPHENONE	mg/kg	4.00E-01	6.70E-01	3.35E-01	7.80E+03	4.29E-05
120-12-7	ANTHRACENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.80E+04	9.72E-06
1912-24-9	ATRAZINE	mg/kg	4.00E-01	6.70E-01	3.35E-01	2.40E+01	1.40E-02
100-52-7	BENZALDEHYDE	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.70E+03	1.97E-04
191-24-2	BENZO[G,H,I]PERYLENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A
207-08-9	BENZO[K]FLUORANTHENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.10E+02	1.59E-03
85-68-7	BENZYL BUTYL PHTHALATE	mg/kg	2.10E-01	3.50E-01	1.75E-01	2.90E+03	6.03E-05
92-52-4	BIPHENYL	mg/kg	2.10E-01	3.50E-01	1.75E-01	4.70E+01	3.72E-03
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.90E+02	9.21E-04
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	4.00E-01	6.70E-01	3.35E-01	2.30E+00	1.46E-01
105-60-2	CAPROLACTAM	mg/kg	4.00E-01	6.70E-01	3.35E-01	3.10E+04	1.08E-05
86-74-8	CARBAZOLE	mg/kg	4.00E-01	6.70E-01	3.35E-01	NV	N/A
53-70-3	DIBENZ[A,H]ANTHRACENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.10E+00	1.59E-01
132-64-9	DIBENZOFURAN	mg/kg	2.10E-01	3.50E-01	1.75E-01	7.30E+01	2.40E-03
84-66-2	DIETHYL PHTHALATE	mg/kg	2.10E-01	3.50E-01	1.75E-01	5.10E+04	3.43E-06
131-11-3	DIMETHYL PHTHALATE	mg/kg	2.10E-01	3.50E-01	1.75E-01	NV	N/A

TABLE E.2
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
84-74-2	DI-N-BUTYL PHTHALATE	mg/kg	2.10E-01	3.50E-01	1.75E-01	6.30E+03	2.78E-05
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	4.00E-01	6.70E-01	3.35E-01	6.30E+02	5.32E-04
86-73-7	FLUORENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	2.40E+03	7.29E-05
118-74-1	HEXACHLOROBENZENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	2.10E+00	8.33E-02
87-68-3	HEXACHLOROBUTADIENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.20E+01	1.46E-02
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.80E+00	1.86E-01
67-72-1	HEXACHLOROETHANE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.80E+01	9.72E-03
193-39-5	INDENO[1,2,3-CD]PYRENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.10E+01	1.59E-02
78-59-1	ISOPHORONE	mg/kg	2.10E-01	3.50E-01	1.75E-01	5.70E+03	3.07E-05
91-20-3	NAPHTHALENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	3.80E+01	4.61E-03
98-95-3	NITROBENZENE	mg/kg	2.10E-01	3.50E-01	1.75E-01	5.10E+01	3.43E-03
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	2.10E-01	3.50E-01	1.75E-01	7.80E-01	2.24E-01
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	2.10E-01	3.50E-01	1.75E-01	1.10E+03	1.59E-04
87-86-5	PENTACHLOROPHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.00E+01	3.35E-02
108-95-2	PHENOL	mg/kg	4.00E-01	6.70E-01	3.35E-01	1.90E+04	1.76E-05
72-54-8	4,4'-DDD	mg/kg	4.00E-03	6.80E-03	3.40E-03	2.30E+01	1.48E-04
72-55-9	4,4'-DDE	mg/kg	4.00E-03	6.80E-03	3.40E-03	2.00E+01	1.70E-04
50-29-3	4,4'-DDT	mg/kg	4.00E-03	6.80E-03	3.40E-03	1.90E+01	1.79E-04
309-00-2	ALDRIN	mg/kg	2.00E-03	3.50E-03	1.75E-03	3.90E-01	4.49E-03
319-84-6	ALPHA-BHC	mg/kg	2.00E-03	3.50E-03	1.75E-03	8.60E-01	2.03E-03
319-85-7	BETA-BHC	mg/kg	2.00E-03	3.50E-03	1.75E-03	3.00E+00	5.83E-04
12789-03-6	CHLORDANE [5]	mg/kg	4.00E-03	7.00E-03	3.50E-03	1.70E+01	2.06E-04
319-86-8	DELTA-BHC	mg/kg	2.00E-03	3.50E-03	1.75E-03	3.00E+00 [6]	5.83E-04
60-57-1	DIELDRIN	mg/kg	4.00E-03	6.80E-03	3.40E-03	3.40E-01	1.00E-02
959-98-8	ENDOSULFAN I	mg/kg	2.00E-03	3.50E-03	1.75E-03	4.70E+02 [7]	3.72E-06
33213-65-9	ENDOSULFAN II	mg/kg	4.00E-03	6.80E-03	3.40E-03	4.70E+02 [7]	7.23E-06
1031-07-8	ENDOSULFAN SULFATE	mg/kg	4.00E-03	6.80E-03	3.40E-03	4.70E+02 [7]	7.23E-06
72-20-8	ENDRIN	mg/kg	4.00E-03	6.80E-03	3.40E-03	1.90E+01	1.79E-04
7421-93-4	ENDRIN ALDEHYDE	mg/kg	4.00E-03	6.80E-03	3.40E-03	1.90E+01 [8]	1.79E-04
53494-70-5	ENDRIN KETONE	mg/kg	4.00E-03	6.80E-03	3.40E-03	1.90E+01 [8]	1.79E-04
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	2.00E-03	3.50E-03	1.75E-03	5.70E+00	3.07E-04
76-44-8	HEPTACHLOR	mg/kg	2.00E-03	3.50E-03	1.75E-03	1.30E+00	1.35E-03

TABLE E.2
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	2.00E-03	3.50E-03	1.75E-03	7.00E-01	2.50E-03
72-43-5	METHOXYCHLOR	mg/kg	2.00E-02	3.50E-02	1.75E-02	3.20E+02	5.47E-05
8001-35-2	TOXAPHENE	mg/kg	2.00E-01	3.50E-01	1.75E-01	4.90E+00	3.57E-02
12674-11-2	AROCLOR-1016	mg/kg	4.00E-02	6.80E-02	3.40E-02	4.10E+00	8.29E-03
11104-28-2	AROCLOR-1221	mg/kg	4.00E-02	6.80E-02	3.40E-02	2.00E+00	1.70E-02
11141-16-5	AROCLOR-1232	mg/kg	4.00E-02	6.80E-02	3.40E-02	1.70E+00	2.00E-02
53469-21-9	AROCLOR-1242	mg/kg	4.00E-02	6.80E-02	3.40E-02	2.30E+00	1.48E-02
12672-29-6	AROCLOR-1248	mg/kg	4.00E-02	6.80E-02	3.40E-02	2.30E+00	1.48E-02
11097-69-1	AROCLOR-1254	mg/kg	4.00E-02	6.80E-02	3.40E-02	1.20E+00	2.83E-02
37324-23-5	AROCLOR-1262	mg/kg	4.00E-02	6.80E-02	3.40E-02	2.40E+00 [9]	1.42E-02
11100-14-4	PCB-1268 (AROCLOR 1268)	mg/kg	4.00E-02	6.80E-02	3.40E-02	2.40E+00 [9]	1.42E-02
18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	5.70E-01	7.80E-01	3.90E-01	3.00E+00	1.30E-01
7440-28-0	**THALLIUM**	**mg/kg**	**2.10E+00**	**3.40E+00**	**1.70E+00**	**7.80E-01**	**2.18E+00**

[1] Set at 1/2 maximum CRQL

[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0)

[3] RSL for unspecified 1,3-dichloropropene

[4] RSL for m-xylene

[5] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[6] RSL for hexachlorocyclohexane, technical

[7] RSL for endosulfan

[8] RSL for endrin

[9] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.3
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	8.10E+03	1.48E-06
79-34-5	1,1,2,2-TETRACHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.00E+00	2.00E-03
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.70E+03	1.79E-06
79-00-5	1,1,2-TRICHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.50E+00	8.00E-03
75-34-3	1,1-DICHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	3.60E+01	3.33E-04
75-35-4	1,1-DICHLOROETHYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.30E+02	5.22E-05
87-61-6	1,2,3-TRICHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.30E+01	1.90E-04
120-82-1	1,2,4-TRICHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	5.80E+01	2.07E-04
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	mg/kg	6.20E-03	2.40E-02	1.20E-02	5.30E-02	2.26E-01
106-93-4	1,2-DIBROMOETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	3.60E-01	3.33E-02
95-50-1	1,2-DICHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.80E+03	6.67E-06
107-06-2	1,2-DICHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	4.60E+00	2.61E-03
78-87-5	1,2-DICHLOROPROPANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.80E+00	4.29E-03
541-73-1	1,3-DICHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	NV	N/A
106-46-7	1,4-DICHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.60E+01	4.62E-04
591-78-6	2-HEXANONE	mg/kg	1.20E-02	4.80E-02	2.40E-02	2.00E+02	1.20E-04
108-10-1	4-METHYL-2-PENTANONE	mg/kg	1.20E-02	4.80E-02	2.40E-02	3.30E+04	7.27E-07
71-43-2	BENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.20E+01	1.00E-03
75-27-4	BROMODICHLOROMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.90E+00	4.14E-03
75-25-2	BROMOFORM	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.90E+02	6.32E-05
74-83-9	BROMOMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.80E+00	1.76E-03
56-23-5	CARBON TETRACHLORIDE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.50E+00	1.85E-03
108-90-7	CHLOROBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.80E+02	4.29E-05
74-97-5	CHLOROBROMOMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.50E+02	8.00E-05
75-00-3	CHLOROETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.40E+04	8.57E-07
67-66-3	CHLOROFORM	mg/kg	6.20E-03	2.40E-02	1.20E-02	3.20E+00	3.75E-03
74-87-3	CHLOROMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.10E+02	1.09E-04
156-59-2	CIS-1,2-DICHLOROETHENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.60E+02	7.50E-05
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.80E+01 [3]	6.67E-04
110-82-7	CYCLOHEXANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.50E+03	1.85E-06
124-48-1	DIBROMOCHLOROMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	8.30E+01	1.45E-04
75-71-8	DICHLORODIFLUOROMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	8.70E+01	1.38E-04

TABLE E.3
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
100-41-4	ETHYLBENZENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	5.80E+01	2.07E-04
98-82-8	ISOPROPYLBENZENE (CUMENE)	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.90E+03	6.32E-06
179601-23-1	m,p-XYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	5.50E+02 [4]	2.18E-05
79-20-9	METHYL ACETATE	mg/kg	6.20E-03	2.40E-02	1.20E-02	7.80E+04	1.54E-07
1634-04-4	METHYL TERT-BUTYL ETHER	mg/kg	6.20E-03	2.40E-02	1.20E-02	4.70E+02	2.55E-05
108-87-2	METHYLCYLOHEXANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	NV	N/A
95-47-6	o-XYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.50E+02	1.85E-05
100-42-5	STYRENE (MONOMER)	mg/kg	6.20E-03	2.40E-02	1.20E-02	6.00E+03	2.00E-06
127-18-4	TETRACHLOROETHYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	8.10E+01	1.48E-04
108-88-3	TOLUENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	4.90E+03	2.45E-06
156-60-5	TRANS-1,2-DICHLOROETHENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.60E+03	7.50E-06
10061-02-6	TRANS-1,3-DICHLOROPROPENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	1.80E+01 [3]	6.67E-04
79-01-6	TRICHLOROETHYLENE	mg/kg	6.20E-03	2.40E-02	1.20E-02	4.10E+00	2.93E-03
75-69-4	TRICHLOROFLUOROMETHANE	mg/kg	6.20E-03	2.40E-02	1.20E-02	2.30E+04	5.22E-07
75-01-4	VINYL CHLORIDE	mg/kg	6.20E-03	2.40E-02	1.20E-02	5.90E-01	2.03E-02
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	2.10E-01	8.00E-01	4.00E-01	2.30E+01	1.74E-02
123-91-1	1,4-DIOXANE	mg/kg	8.00E-02	3.10E-01	1.55E-01	5.30E+01	2.92E-03
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	4.00E-01	1.60E+00	8.00E-01	3.10E+03	2.58E-04
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.90E+03	2.11E-04
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	6.30E+03	6.35E-05
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	6.30E+01	6.35E-03
120-83-2	2,4-DICHLOROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.90E+02	2.11E-03
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.30E+03	3.08E-04
51-28-5	2,4-DINITROPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.30E+02	6.15E-03
121-14-2	2,4-DINITROTOLUENE	mg/kg	2.10E-01	7.70E-01	3.85E-01	1.70E+01	2.26E-02
91-58-7	2-CHLORONAPHTHALENE	mg/kg	2.10E-01	8.00E-01	4.00E-01	4.80E+03	8.33E-05
95-57-8	2-CHLOROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	3.90E+02	1.03E-03
95-48-7	2-METHLYPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	3.20E+03	2.50E-04
88-74-4	2-NITROANILINE	mg/kg	2.10E-01	8.00E-01	4.00E-01	6.30E+02	6.35E-04
88-75-5	2-NITROPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	NV	N/A
91-94-1	3,3'-DICHLOROBENZIDINE	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.20E+01	6.67E-02
99-09-2	3-NITROANILINE	mg/kg	4.00E-01	1.60E+00	8.00E-01	NV	N/A

TABLE E.3
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	5.10E+00	1.57E-01
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	2.10E-01	8.00E-01	4.00E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	2.10E-01	8.00E-01	4.00E-01	6.30E+03	6.35E-05
106-47-8	4-CHLOROANILINE	mg/kg	4.00E-01	1.60E+00	8.00E-01	2.70E+01	2.96E-02
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	2.10E-01	8.00E-01	4.00E-01	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	6.30E+03	1.27E-04
100-01-6	4-NITROANILINE	mg/kg	4.00E-01	1.60E+00	8.00E-01	2.50E+02	3.20E-03
100-02-7	4-NITROPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	NV	N/A
1912-24-9	ATRAZINE	mg/kg	4.00E-01	1.60E+00	8.00E-01	2.40E+01	3.33E-02
100-52-7	BENZALDEHYDE	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.70E+03	4.71E-04
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.90E+02	2.11E-03
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	4.00E-01	1.60E+00	8.00E-01	2.30E+00	3.48E-01
84-66-2	DIETHYL PHTHALATE	mg/kg	2.10E-01	8.00E-01	4.00E-01	5.10E+04	7.84E-06
118-74-1	HEXACHLOROBENZENE	mg/kg	2.10E-01	8.00E-01	4.00E-01	2.10E+00	1.90E-01
87-68-3	HEXACHLOROBUTADIENE	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.20E+01	3.33E-02
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.80E+00	4.44E-01
67-72-1	HEXACHLOROETHANE	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.80E+01	2.22E-02
78-59-1	ISOPHORONE	mg/kg	2.10E-01	8.00E-01	4.00E-01	5.70E+03	7.02E-05
98-95-3	NITROBENZENE	mg/kg	2.10E-01	7.70E-01	3.85E-01	5.10E+01	7.55E-03
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	2.10E-01	8.00E-01	4.00E-01	7.80E-01	5.13E-01
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	2.10E-01	8.00E-01	4.00E-01	1.10E+03	3.64E-04
87-86-5	PENTACHLOROPHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.00E+01	8.00E-02
108-95-2	PHENOL	mg/kg	4.00E-01	1.60E+00	8.00E-01	1.90E+04	4.21E-05
319-84-6	ALPHA-BHC	mg/kg	2.10E-03	8.07E-03	4.03E-03	8.60E-01	4.69E-03
319-86-8	DELTA-BHC	mg/kg	2.10E-03	8.07E-03	4.03E-03	3.00E+00 [5]	1.34E-03
959-98-8	ENDOSULFAN I	mg/kg	2.10E-03	8.07E-03	4.03E-03	4.70E+02 [6]	8.58E-06
33213-65-9	ENDOSULFAN II	mg/kg	4.00E-03	1.57E-02	7.83E-03	4.70E+02 [6]	1.67E-05
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	2.10E-03	8.07E-03	4.03E-03	7.00E-01	5.76E-03
8001-35-2	TOXAPHENE	mg/kg	2.10E-01	8.07E-01	4.03E-01	4.90E+00	8.23E-02
12674-11-2	AROCLOR-1016	mg/kg	4.00E-02	1.60E-01	8.00E-02	4.10E+00	1.95E-02
11104-28-2	AROCLOR-1221	mg/kg	4.00E-02	1.60E-01	8.00E-02	2.00E+00	4.00E-02
11141-16-5	AROCLOR-1232	mg/kg	4.00E-02	1.60E-01	8.00E-02	1.70E+00	4.71E-02

TABLE E.3
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
53469-21-9	AROCLOR-1242	mg/kg	4.00E-02	1.60E-01	8.00E-02	2.30E+00	3.48E-02
37324-23-5	AROCLOR-1262	mg/kg	4.00E-02	1.60E-01	8.00E-02	2.40E+00 [7]	3.33E-02
11100-14-4	AROCLOR-1268	mg/kg	4.00E-02	1.60E-01	8.00E-02	2.40E+00 [7]	3.33E-02

[1] Set at 1/2 maximum CRQL

[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0)

[3] RSL for unspecified 1,3-dichloropropene

[4] RSL for m-xylene

[5] RSL for hexachlorocyclohexane, technical

[6] RSL for endosulfan

[7] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.00E+03	3.13E-04
79-34-5	**1,1,2,2-TETRACHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.60E-01**	**3.29E+00**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.00E+04	2.50E-04
79-00-5	**1,1,2-TRICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.10E-01**	**6.10E+00**
75-34-3	1,1-DICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+01	8.93E-02
75-35-4	1,1-DICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+02	8.93E-03
87-61-6	1,2,3-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.00E+00	3.57E-01
120-82-1	1,2,4-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.30E-03**	**7.58E+02**
106-93-4	**1,2-DIBROMOETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.50E-02**	**3.33E+01**
95-50-1	1,2-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.00E+02	8.33E-03
107-06-2	**1,2-DICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
78-87-5	**1,2-DICHLOROPROPANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
541-73-1	1,3-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.20E+02	7.81E-03
106-46-7	1,4-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.80E+00	5.21E-01
78-93-3	2-BUTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	5.60E+03	8.93E-04
591-78-6	2-HEXANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
108-10-1	4-METHYL-2-PENTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	6.30E+03	7.94E-04
67-64-1	ACETONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.40E+04	3.57E-04
71-43-2	BENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+00	5.43E-01
75-27-4	**BROMODICHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.30E+00**	**1.92E+00**
75-25-2	BROMOFORM	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
74-83-9	BROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+00	3.33E-01
75-15-0	CARBON DISULFIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+02	3.09E-03
56-23-5	**CARBON TETRACHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.30E+00**	**1.09E+00**
108-90-7	CHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.80E+01	3.21E-02
74-97-5	CHLOROBROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.30E+01	3.01E-02
75-00-3	CHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.10E+04	1.19E-04
67-66-3	**CHLOROFORM**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.20E+00**	**1.14E+00**
74-87-3	CHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
156-59-2	CIS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01
110-82-7	CYCLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.30E+04	1.92E-04

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
124-48-1	DIBROMOCHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
75-71-8	DICHLORODIFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+02	1.25E-02
100-41-4	ETHYLBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+01	1.67E-01
98-82-8	ISOPROPYLBENZENE (CUMENE)	ug/L	5.00E+00	5.00E+00	2.50E+00	4.50E+02	5.56E-03
179601-23-1	m,p-XYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02 [4]	1.32E-02
79-20-9	METHYL ACETATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+04	1.25E-04
1634-04-4	METHYL TERT-BUTYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
108-87-2	METHYLCYLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-09-2	METHYLENE CHLORIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
95-47-6	o-XYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
100-42-5	STYRENE (MONOMER)	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
127-18-4	TETRACHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	6.90E+00	3.62E-01
108-88-3	TOLUENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.10E+02	4.90E-03
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01
79-01-6	TRICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+00	8.93E-01
75-69-4	TRICHLOROFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.20E+03	4.81E-04
75-01-4	**VINYL CHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.90E-01**	**1.32E+01**
95-94-3	**1,2,4,5-TETRACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
123-91-1	1,4-DIOXANE	ug/L	2.00E+00	2.00E+00	1.00E+00	4.60E+00	2.17E-01
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	ug/L	1.00E+01	1.00E+01	5.00E+00	7.10E+02	7.04E-03
58-90-2	2,3,4,6-TETRACHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	2.40E+02	1.04E-02
95-95-4	2,4,5-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
88-06-2	2,4,6-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+01	2.08E-01
120-83-2	2,4-DICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
105-67-9	2,4-DIMETHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+02	6.94E-03
51-28-5	2,4-DINITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	3.90E+01	1.28E-01
121-14-2	**2,4-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.10E+00**	**2.27E+00**
606-20-2	**2,6-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**4.90E-01**	**5.10E+00**
91-58-7	2-CHLORONAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+02	3.33E-03
95-57-8	2-CHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+01	3.09E-02
95-48-7	2-METHLYPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	9.30E+02	5.38E-03
91-57-6	2-METHYLNAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
88-74-4	2-NITROANILINE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
88-75-5	2-NITROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
91-94-1	**3,3'-DICHLOROBENZIDINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**2.10E-01**	**2.38E+01**
99-09-2	3-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
534-52-1	**4,6-DINITRO-2-METHYLPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.50E+00**	**3.33E+00**
101-55-3	4-BROMOPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+03	1.79E-03
106-47-8	**4-CHLOROANILINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.70E+00**	**1.35E+00**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
106-44-5	4-METHLYPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+03	2.63E-03
100-01-6	4-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
100-02-7	4-NITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
83-32-9	ACENAPHTHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
208-96-8	ACENAPHTHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
98-86-2	ACETOPHENONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+03	2.63E-03
120-12-7	ANTHRACENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.80E+03	1.39E-03
1912-24-9	**ATRAZINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.00E+00**	**1.67E+00**
100-52-7	BENZALDEHYDE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+02	2.63E-02
56-55-3	**BENZO[A]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
50-32-8	**BENZO[A]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
205-99-2	**BENZO[B]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
191-24-2	BENZO[G,H,I]PERYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
207-08-9	**BENZO[K]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
85-68-7	BENZYL BUTYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+03	1.67E-03
92-52-4	**BIPHENYL**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.30E-01**	**3.01E+00**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.90E+01	4.24E-02
111-44-4	**BIS(2-CHLOROETHYL) ETHER**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.40E-01**	**3.57E+01**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+01	2.08E-01
105-60-2	CAPROLACTAM	ug/L	1.00E+01	1.00E+01	5.00E+00	9.90E+03	5.05E-04
86-74-8	CARBAZOLE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
218-01-9	**CHRYSENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.80E-02**	**1.39E+02**
53-70-3	**DIBENZ[A,H]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
132-64-9	DIBENZOFURAN	ug/L	5.00E+00	5.00E+00	2.50E+00	7.90E+00	3.16E-01

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
84-66-2	DIETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+04	1.67E-04
131-11-3	DIMETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.70E+05	9.26E-06
117-84-0	DI-N-OCTYL PHTHALATE	ug/L	1.00E+01	1.00E+01	5.00E+00	2.00E+02	2.50E-02
206-44-0	FLUORANTHENE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.30E+02	3.85E-02
86-73-7	FLUORENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.90E+02	8.62E-03
118-74-1	**HEXACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
87-68-3	**HEXACHLOROBUTADIENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
67-72-1	HEXACHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+00	7.58E-01
193-39-5	**INDENO[1,2,3-CD]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
78-59-1	ISOPHORONE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.50E+02	7.14E-03
91-20-3	**NAPHTHALENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
98-95-3	**NITROBENZENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
621-64-7	**N-NITROSODI-N-PROPYLAMINE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**5.00E-02**	**5.00E+01**
86-30-6	N-NITROSODIPHENYLAMINE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
87-86-5	**PENTACHLOROPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
85-01-8	PHENANTHRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
108-95-2	PHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	5.80E+03	8.62E-04
129-00-0	PYRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
72-54-8	**4,4'-DDD**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**3.10E-03**	**1.61E+01**
72-55-9	**4,4'-DDE**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
50-29-3	**4,4'-DDT**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
309-00-2	**ALDRIN**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**4.90E-04**	**5.10E+01**
319-84-6	ALPHA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.60E-02	9.62E-01
319-85-7	BETA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	9.10E-02	2.75E-01
12789-03-6	**CHLORDANE [5]**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**8.00E-03**	**6.25E+00**
319-86-8	DELTA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.50E-01 [6]	1.00E-01
60-57-1	**DIELDRIN**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**5.20E-04**	**9.62E+01**
959-98-8	ENDOSULFAN I	ug/L	5.00E-02	5.00E-02	2.50E-02	6.20E+01	4.03E-04
33213-65-9	ENDOSULFAN II	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
1031-07-8	ENDOSULFAN SULFATE	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04
72-20-8	ENDRIN	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
7421-93-4	ENDRIN ALDEHYDE	ug/L	1.00E-01	1.00E-01	5.00E-02	2.90E-01	1.72E-01
53494-70-5	ENDRIN KETONE	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
58-89-9	GAMMA-BHC (LINDANE)	ug/L	5.00E-02	5.00E-02	2.50E-02	4.20E-01	5.95E-02
76-44-8	**HEPTACHLOR**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**7.90E-04**	**3.16E+01**
1024-57-3	**HEPTACHLOR EPOXIDE**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**3.90E-04**	**6.41E+01**
72-43-5	METHOXYCHLOR	ug/L	5.00E-01	5.00E-01	2.50E-01	3.70E+01	6.76E-03
8001-35-2	**TOXAPHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
12674-11-2	AROCLOR-1016	ug/L	1.00E+00	1.00E+00	5.00E-01	1.40E+00	3.57E-01
11104-28-2	**AROCLOR-1221**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**
11141-16-5	**AROCLOR-1232**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**
53469-21-9	**AROCLOR-1242**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
12672-29-6	**AROCLOR-1248**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11097-69-1	**AROCLOR-1254**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11096-82-5	**AROCLOR-1260**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
37324-23-5	**AROCLOR-1262**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
11100-14-4	**AROCLOR-1268**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
99-35-4	1,3,5-TRINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	5.90E+02	1.69E-04
118-96-7	2,4,6-TRINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	9.80E+00	1.02E-02
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
88-72-2	2-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	3.10E+00	8.06E-02
99-08-1	3-NITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	1.70E+00	5.88E-02
19406-51-0	4-AMINO-2,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
99-99-0	4-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	4.30E+01	5.81E-03
99-65-0	M-DINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	2.00E+00	5.00E-02
2691-41-0	OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE (HMX)	ug/L	2.00E-01	2.00E-01	1.00E-01	1.00E+03	1.00E-04
121-82-4	RDX	ug/L	2.00E-01	2.00E-01	1.00E-01	7.00E+00	1.43E-02

TABLE E.4
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Estuarine Wetland Surface Water
Exposure Medium:Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
7440-41-7	BERYLLIUM	ug/L	1.00E+00	1.00E+00	5.00E-01	2.50E+01	2.00E-02
18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.50E-01**	**1.43E+01**
7439-97-6	MERCURY	ug/L	2.00E-01	2.00E-01	1.00E-01	6.30E-01	1.59E-01
7440-22-4	SILVER	ug/L	1.00E+00	1.00E+00	5.00E-01	9.40E+01	5.32E-03
10098-97-2	STRONTIUM-90	pCi/L	3.00E+00	3.00E+00	1.50E+00	7.07E+00	2.12E-01

[1] Set at 1/2 maximum CRQL

[2] The lower of the EPA Regional Screening Level (RSL) for Tapwater November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0); Code of Virginia, Water Quality Standards, Public Water Supply (96VAC25-260-140), or Code of Virginia, Water Quality Standards, All Other Surface Waters (96VAC25-260-140)

[3] RSL for unspecified 1,3-dichloropropene

[4] RSL for xylenes

[5] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[6] RSL for hexachlorocyclohexane, technical

[7] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.5
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	2.30E+01	1.52E-02
123-91-1	1,4-DIOXANE	mg/kg	2.70E-01	2.70E-01	1.35E-01	5.30E+01	2.55E-03
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	1.30E+00	1.40E+00	7.00E-01	3.10E+03	2.26E-04
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.90E+03	1.84E-04
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	6.30E+03	5.56E-05
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	6.30E+01	5.56E-03
120-83-2	2,4-DICHLOROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.90E+02	1.84E-03
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.30E+03	2.69E-04
51-28-5	2,4-DINITROPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.30E+02	5.38E-03
121-14-2	2,4-DINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	1.70E+01	7.35E-03
606-20-2	2,6-DINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.60E+00	3.47E-02
91-58-7	2-CHLORONAPHTHALENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	4.80E+03	7.29E-05
95-57-8	2-CHLOROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	3.90E+02	8.97E-04
95-48-7	2-METHLYPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	3.20E+03	2.19E-04
91-57-6	2-METHYLNAPHTHALENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	2.40E+02	1.46E-03
88-74-4	2-NITROANILINE	mg/kg	6.80E-01	7.00E-01	3.50E-01	6.30E+02	5.56E-04
88-75-5	2-NITROPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
91-94-1	3,3'-DICHLOROBENZIDINE	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.20E+01	5.83E-02
99-09-2	3-NITROANILINE	mg/kg	1.30E+00	1.40E+00	7.00E-01	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	5.10E+00	1.37E-01
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	6.80E-01	7.00E-01	3.50E-01	6.30E+03	5.56E-05
106-47-8	4-CHLOROANILINE	mg/kg	1.30E+00	1.40E+00	7.00E-01	2.70E+01	2.59E-02
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	6.30E+03	1.11E-04
100-01-6	4-NITROANILINE	mg/kg	1.30E+00	1.40E+00	7.00E-01	2.50E+02	2.80E-03
100-02-7	4-NITROPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	NV	N/A
83-32-9	ACENAPHTHENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	3.60E+03	9.72E-05
208-96-8	ACENAPHTHYLENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
98-86-2	ACETOPHENONE	mg/kg	1.30E+00	1.40E+00	7.00E-01	7.80E+03	8.97E-05
1912-24-9	ATRAZINE	mg/kg	1.30E+00	1.40E+00	7.00E-01	2.40E+01	2.92E-02
100-52-7	BENZALDEHYDE	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.70E+03	4.12E-04

TABLE E.5
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
85-68-7	BENZYL BUTYL PHTHALATE	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
92-52-4	BIPHENYL	mg/kg	6.80E-01	7.00E-01	3.50E-01	4.70E+01	7.45E-03
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.90E+02	1.84E-03
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	1.30E+00	1.40E+00	7.00E-01	2.30E+00	3.04E-01
105-60-2	CAPROLACTAM	mg/kg	1.30E+00	1.40E+00	7.00E-01	3.10E+04	2.26E-05
86-74-8	CARBAZOLE	mg/kg	1.30E+00	1.40E+00	7.00E-01	NV	N/A
132-64-9	DIBENZOFURAN	mg/kg	6.80E-01	7.00E-01	3.50E-01	7.30E+01	4.79E-03
84-66-2	DIETHYL PHTHALATE	mg/kg	6.80E-01	7.00E-01	3.50E-01	5.10E+04	6.86E-06
131-11-3	DIMETHYL PHTHALATE	mg/kg	6.80E-01	7.00E-01	3.50E-01	NV	N/A
84-74-2	DI-N-BUTYL PHTHALATE	mg/kg	6.80E-01	7.00E-01	3.50E-01	6.30E+03	5.56E-05
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	1.30E+00	1.40E+00	7.00E-01	6.30E+02	1.11E-03
86-73-7	FLUORENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	2.40E+03	1.46E-04
118-74-1	HEXACHLOROBENZENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	2.10E+00	1.67E-01
87-68-3	HEXACHLOROBUTADIENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.20E+01	2.92E-02
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.80E+00	3.89E-01
67-72-1	HEXACHLOROETHANE	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.80E+01	1.94E-02
78-59-1	ISOPHORONE	mg/kg	6.80E-01	7.00E-01	3.50E-01	5.70E+03	6.14E-05
91-20-3	NAPHTHALENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	3.80E+01	9.21E-03
98-95-3	NITROBENZENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	5.10E+01	2.45E-03
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	6.80E-01	7.00E-01	3.50E-01	7.80E-01	4.49E-01
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	6.80E-01	7.00E-01	3.50E-01	1.10E+03	3.18E-04
87-86-5	PENTACHLOROPHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.00E+01	7.00E-02
108-95-2	PHENOL	mg/kg	1.30E+00	1.40E+00	7.00E-01	1.90E+04	3.68E-05
72-54-8	4,4'-DDD	mg/kg	1.30E-02	1.40E-02	7.00E-03	2.30E+01	3.04E-04
72-55-9	4,4'-DDE	mg/kg	1.30E-02	1.40E-02	7.00E-03	2.00E+01	3.50E-04
50-29-3	4,4'-DDT	mg/kg	1.30E-02	1.40E-02	7.00E-03	1.90E+01	3.68E-04
309-00-2	ALDRIN	mg/kg	6.80E-03	7.00E-03	3.50E-03	3.90E-01	8.97E-03
319-84-6	ALPHA-BHC	mg/kg	6.80E-03	7.00E-03	3.50E-03	8.60E-01	4.07E-03
319-85-7	BETA-BHC	mg/kg	6.80E-03	7.00E-03	3.50E-03	3.00E+00	1.17E-03
12789-03-6	CHLORDANE [3]	mg/kg	1.36E-02	1.40E-02	7.00E-03	1.70E+01	4.12E-04
319-86-8	DELTA-BHC	mg/kg	6.80E-03	7.00E-03	3.50E-03	3.00E+00 [4]	1.17E-03
60-57-1	DIELDRIN	mg/kg	1.30E-02	1.40E-02	7.00E-03	3.40E-01	2.06E-02
959-98-8	ENDOSULFAN I	mg/kg	6.80E-03	7.00E-03	3.50E-03	4.70E+02 [5]	7.45E-06
33213-65-9	ENDOSULFAN II	mg/kg	1.30E-02	1.40E-02	7.00E-03	4.70E+02 [5]	1.49E-05
1031-07-8	ENDOSULFAN SULFATE	mg/kg	1.30E-02	1.40E-02	7.00E-03	4.70E+02 [5]	1.49E-05

TABLE E.5
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
72-20-8	ENDRIN	mg/kg	1.30E-02	1.40E-02	7.00E-03	1.90E+01	3.68E-04
7421-93-4	ENDRIN ALDEHYDE	mg/kg	1.30E-02	1.40E-02	7.00E-03	1.90E+01 [6]	3.68E-04
53494-70-5	ENDRIN KETONE	mg/kg	1.30E-02	1.40E-02	7.00E-03	1.90E+01 [6]	3.68E-04
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	6.80E-03	7.00E-03	3.50E-03	5.70E+00	6.14E-04
76-44-8	HEPTACHLOR	mg/kg	6.80E-03	7.00E-03	3.50E-03	1.30E+00	2.69E-03
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	6.80E-03	7.00E-03	3.50E-03	7.00E-01	5.00E-03
72-43-5	METHOXYCHLOR	mg/kg	6.80E-02	7.00E-02	3.50E-02	3.20E+02	1.09E-04
8001-35-2	TOXAPHENE	mg/kg	6.80E-01	7.00E-01	3.50E-01	4.90E+00	7.14E-02
12674-11-2	AROCLOR-1016	mg/kg	1.30E-01	1.40E-01	7.00E-02	4.10E+00	1.71E-02
11104-28-2	AROCLOR-1221	mg/kg	1.30E-01	1.40E-01	7.00E-02	2.00E+00	3.50E-02
11141-16-5	AROCLOR-1232	mg/kg	1.30E-01	1.40E-01	7.00E-02	1.70E+00	4.12E-02
53469-21-9	AROCLOR-1242	mg/kg	1.30E-01	1.40E-01	7.00E-02	2.30E+00	3.04E-02
12672-29-6	AROCLOR-1248	mg/kg	1.30E-01	1.40E-01	7.00E-02	2.30E+00	3.04E-02
37324-23-5	AROCLOR-1262	mg/kg	1.30E-01	1.40E-01	7.00E-02	2.40E+00 [7]	2.92E-02
11100-14-4	PCB-1268 (AROCLOR 1268)	mg/kg	1.30E-01	1.40E-01	7.00E-02	2.40E+00 [7]	2.92E-02
18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	1.87E+00	1.88E+00	9.40E-01	3.00E+00	3.13E-01
10098-97-2	STRONTIUM-90	pCi/g	3.00E+00	3.00E+00	1.50E+00	3.13E+01	4.79E-02

[1] Set at 1/2 maximum CRQL

[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0)

[3] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[4] RSL for hexachlorocyclohexane, technical

[5] RSL for endosulfan

[6] RSL for endrin

[7] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.00E+03	3.13E-04
79-34-5	**1,1,2,2-TETRACHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.60E-01**	**3.29E+00**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.00E+04	2.50E-04
79-00-5	**1,1,2-TRICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.10E-01**	**6.10E+00**
75-34-3	1,1-DICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+01	8.93E-02
75-35-4	1,1-DICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+02	8.93E-03
87-61-6	1,2,3-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.00E+00	3.57E-01
120-82-1	1,2,4-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.30E-03**	**7.58E+02**
106-93-4	**1,2-DIBROMOETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.50E-02**	**3.33E+01**
95-50-1	1,2-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.00E+02	8.33E-03
107-06-2	**1,2-DICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
78-87-5	**1,2-DICHLOROPROPANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
541-73-1	1,3-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.20E+02	7.81E-03
106-46-7	1,4-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.80E+00	5.21E-01
78-93-3	2-BUTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	5.60E+03	8.93E-04
591-78-6	2-HEXANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
108-10-1	4-METHYL-2-PENTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	6.30E+03	7.94E-04
67-64-1	ACETONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.40E+04	3.57E-04
71-43-2	BENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+00	5.43E-01
75-27-4	**BROMODICHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.30E+00**	**1.92E+00**
75-25-2	BROMOFORM	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
74-83-9	BROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+00	3.33E-01
75-15-0	CARBON DISULFIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+02	3.09E-03
56-23-5	**CARBON TETRACHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.30E+00**	**1.09E+00**
108-90-7	CHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.80E+01	3.21E-02
74-97-5	CHLOROBROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.30E+01	3.01E-02
75-00-3	CHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.10E+04	1.19E-04
67-66-3	**CHLOROFORM**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.20E+00**	**1.14E+00**
74-87-3	CHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
156-59-2	CIS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
110-82-7	CYCLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.30E+04	1.92E-04
124-48-1	DIBROMOCHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
75-71-8	DICHLORODIFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+02	1.25E-02
100-41-4	ETHYLBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+01	1.67E-01
98-82-8	ISOPROPYLBENZENE (CUMENE)	ug/L	5.00E+00	5.00E+00	2.50E+00	4.50E+02	5.56E-03
179601-23-1	m,p-Xylene	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02 [4]	1.32E-02
79-20-9	METHYL ACETATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+04	1.25E-04
1634-04-4	METHYL TERT-BUTYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
108-87-2	METHYLCYLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-09-2	METHYLENE CHLORIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
95-47-6	o-Xylene	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
100-42-5	STYRENE (MONOMER)	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
127-18-4	TETRACHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	6.90E+00	3.62E-01
108-88-3	TOLUENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.10E+02	4.90E-03
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01
79-01-6	TRICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+00	8.93E-01
75-69-4	TRICHLOROFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.20E+03	4.81E-04
75-01-4	**VINYL CHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.90E-01**	**1.32E+01**
95-94-3	**1,2,4,5-TETRACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
123-91-1	1,4-DIOXANE	ug/L	2.00E+00	2.00E+00	1.00E+00	4.60E+00	2.17E-01
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	ug/L	1.00E+01	1.00E+01	5.00E+00	7.10E+02	7.04E-03
58-90-2	2,3,4,6-TETRACHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	2.40E+02	1.04E-02
95-95-4	2,4,5-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
88-06-2	2,4,6-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+01	2.08E-01
120-83-2	2,4-DICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
105-67-9	2,4-DIMETHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+02	6.94E-03
51-28-5	2,4-DINITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	3.90E+01	1.28E-01
121-14-2	**2,4-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.10E+00**	**2.27E+00**
606-20-2	**2,6-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**4.90E-01**	**5.10E+00**
91-58-7	2-CHLORONAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+02	3.33E-03
95-57-8	2-CHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+01	3.09E-02

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
95-48-7	2-METHLYPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	9.30E+02	5.38E-03
91-57-6	2-METHYLNAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02
88-74-4	2-NITROANILINE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
88-75-5	2-NITROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
91-94-1	**3,3`-DICHLOROBENZIDINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**2.10E-01**	**2.38E+01**
99-09-2	3-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
534-52-1	**4,6-DINITRO-2-METHYLPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.50E+00**	**3.33E+00**
101-55-3	4-BROMOPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+03	1.79E-03
106-47-8	**4-CHLOROANILINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.70E+00**	**1.35E+00**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
100-01-6	4-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
100-02-7	4-NITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
83-32-9	ACENAPHTHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
208-96-8	ACENAPHTHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
98-86-2	ACETOPHENONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+03	2.63E-03
120-12-7	ANTHRACENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.80E+03	1.39E-03
1912-24-9	**ATRAZINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.00E+00**	**1.67E+00**
100-52-7	BENZALDEHYDE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+02	2.63E-02
56-55-3	**BENZO[A]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
50-32-8	**BENZO[A]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
205-99-2	**BENZO[B]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
191-24-2	BENZO[G,H,I]PERYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
207-08-9	**BENZO[K]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
85-68-7	BENZYL BUTYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+03	1.67E-03
92-52-4	**BIPHENYL**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.30E-01**	**3.01E+00**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.90E+01	4.24E-02
111-44-4	**BIS(2-CHLOROETHYL) ETHER**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.40E-01**	**3.57E+01**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+01	2.08E-01
86-74-8	CARBAZOLE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
218-01-9	**CHRYSENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.80E-02**	**1.39E+02**
53-70-3	**DIBENZ[A,H]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
132-64-9	DIBENZOFURAN	ug/L	5.00E+00	5.00E+00	2.50E+00	7.90E+00	3.16E-01
84-66-2	DIETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+04	1.67E-04
131-11-3	DIMETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.70E+05	9.26E-06
84-74-2	DI-N-BUTYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	9.00E+02	2.78E-03
117-84-0	DI-N-OCTYL PHTHALATE	ug/L	1.00E+01	1.00E+01	5.00E+00	2.00E+02	2.50E-02
206-44-0	FLUORANTHENE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.30E+02	3.85E-02
86-73-7	FLUORENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.90E+02	8.62E-03
118-74-1	**HEXACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
87-68-3	**HEXACHLOROBUTADIENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
67-72-1	HEXACHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+00	7.58E-01
193-39-5	**INDENO[1,2,3-CD]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
78-59-1	ISOPHORONE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.50E+02	7.14E-03
91-20-3	**NAPHTHALENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
98-95-3	**NITROBENZENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
621-64-7	**N-NITROSODI-N-PROPYLAMINE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**5.00E-02**	**5.00E+01**
86-30-6	N-NITROSODIPHENYLAMINE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
87-86-5	**PENTACHLOROPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
85-01-8	PHENANTHRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
108-95-2	PHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	5.80E+03	8.62E-04
129-00-0	PYRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
72-54-8	**4,4'-DDD**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**3.10E-03**	**1.61E+01**
72-55-9	**4,4'-DDE**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
50-29-3	**4,4'-DDT**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
309-00-2	**ALDRIN**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**4.90E-04**	**5.10E+01**
319-84-6	ALPHA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.60E-02	9.62E-01
319-85-7	BETA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	9.10E-02	2.75E-01
12789-03-6	**CHLORDANE [5]**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**8.00E-03**	**6.25E+00**
319-86-8	DELTA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.50E-01 [6]	1.00E-01
60-57-1	**DIELDRIN**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**5.20E-04**	**9.62E+01**
959-98-8	ENDOSULFAN I	ug/L	5.00E-02	5.00E-02	2.50E-02	6.20E+01	4.03E-04
33213-65-9	ENDOSULFAN II	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
1031-07-8	ENDOSULFAN SULFATE	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04
72-20-8	ENDRIN	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
7421-93-4	ENDRIN ALDEHYDE	ug/L	1.00E-01	1.00E-01	5.00E-02	2.90E-01	1.72E-01
53494-70-5	ENDRIN KETONE	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
58-89-9	GAMMA-BHC (LINDANE)	ug/L	5.00E-02	5.00E-02	2.50E-02	4.20E-01	5.95E-02
76-44-8	**HEPTACHLOR**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**7.90E-04**	**3.16E+01**
1024-57-3	**HEPTACHLOR EPOXIDE**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**3.90E-04**	**6.41E+01**
72-43-5	METHOXYCHLOR	ug/L	5.00E-01	5.00E-01	2.50E-01	3.70E+01	6.76E-03
8001-35-2	**TOXAPHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
12674-11-2	AROCLOR-1016	ug/L	1.00E+00	1.00E+00	5.00E-01	1.40E+00	3.57E-01
11104-28-2	**AROCLOR-1221**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**
11141-16-5	**AROCLOR-1232**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**
53469-21-9	**AROCLOR-1242**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
12672-29-6	**AROCLOR-1248**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11097-69-1	**AROCLOR-1254**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11096-82-5	**AROCLOR-1260**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
37324-23-5	**AROCLOR-1262**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
11100-14-4	**AROCLOR-1268**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
99-35-4	1,3,5-TRINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	5.90E+02	1.69E-04
118-96-7	2,4,6-TRINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	9.80E+00	1.02E-02
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
88-72-2	2-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	3.10E+00	8.06E-02
99-08-1	3-NITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	1.70E+00	5.88E-02
19406-51-0	4-AMINO-2,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
99-99-0	4-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	4.30E+01	5.81E-03
99-65-0	M-DINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	2.00E+00	5.00E-02
2691-41-0	OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE (HMX)	ug/L	2.00E-01	2.00E-01	1.00E-01	1.00E+03	1.00E-04
121-82-4	RDX	ug/L	2.00E-01	2.00E-01	1.00E-01	7.00E+00	1.43E-02
7440-36-0	ANTIMONY	ug/L	2.00E+00	2.00E+00	1.00E+00	5.60E+00	1.79E-01
7440-41-7	BERYLLIUM	ug/L	1.00E+00	1.00E+00	5.00E-01	2.50E+01	2.00E-02

TABLE E.6
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Northern Drainage Channel Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.50E-01**	**1.43E+01**
57-12-5	**CYANIDE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.50E+00**	**3.33E+00**
7439-97-6	MERCURY	ug/L	2.00E-01	2.00E-01	1.00E-01	6.30E-01	1.59E-01
7782-49-2	SELENIUM	ug/L	5.00E+00	5.00E+00	2.50E+00	1.00E+02	2.50E-02
7440-22-4	SILVER	ug/L	1.00E+00	1.00E+00	5.00E-01	9.40E+01	5.32E-03
10098-97-2	STRONTIUM-90	pCi/L	3.00E+00	3.00E+00	1.50E+00	7.07E+00	2.12E-01

[1] Set at 1/2 maximum CRQL

[2] The lower of the EPA Regional Screening Level (RSL) for Tapwater November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0); Code of Virginia, Water Quality Standards, Public Water Supply (96VAC25-260-140), or Code of Virginia, Water Quality Standards, All Other Surface Waters (96VAC25-260-140)

[3] RSL for unspecified 1,3-dichloropropene

[4] RSL for xylenes

[5] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[6] RSL for hexachlorocyclohexane, technical

[7] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.7
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	8.10E+03	9.26E-07
79-34-5	1,1,2,2-TETRACHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.00E+00	1.25E-03
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.70E+03	1.12E-06
79-00-5	1,1,2-TRICHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.50E+00	5.00E-03
75-34-3	1,1-DICHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	3.60E+01	2.08E-04
75-35-4	1,1-DICHLOROETHYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.30E+02	3.26E-05
87-61-6	1,2,3-TRICHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.30E+01	1.19E-04
120-82-1	1,2,4-TRICHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	5.80E+01	1.29E-04
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	mg/kg	7.20E-03	1.50E-02	7.50E-03	5.30E-02	1.42E-01
106-93-4	1,2-DIBROMOETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	3.60E-01	2.08E-02
95-50-1	1,2-DICHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.80E+03	4.17E-06
107-06-2	1,2-DICHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	4.60E+00	1.63E-03
78-87-5	1,2-DICHLOROPROPANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.80E+00	2.68E-03
541-73-1	1,3-DICHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	NV	N/A
106-46-7	1,4-DICHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.60E+01	2.88E-04
78-93-3	2-BUTANONE	mg/kg	1.40E-02	3.10E-02	1.55E-02	2.70E+04	5.74E-07
591-78-6	2-HEXANONE	mg/kg	1.40E-02	3.10E-02	1.55E-02	2.00E+02	7.75E-05
108-10-1	4-METHYL-2-PENTANONE	mg/kg	1.40E-02	3.10E-02	1.55E-02	3.30E+04	4.70E-07
67-64-1	ACETONE	mg/kg	1.40E-02	3.10E-02	1.55E-02	6.10E+04	2.54E-07
71-43-2	BENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.20E+01	6.25E-04
75-27-4	BROMODICHLOROMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.90E+00	2.59E-03
75-25-2	BROMOFORM	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.90E+02	3.95E-05
74-83-9	BROMOMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.80E+00	1.10E-03
75-15-0	CARBON DISULFIDE	mg/kg	7.20E-03	1.50E-02	7.50E-03	7.70E+02	9.74E-06
56-23-5	CARBON TETRACHLORIDE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.50E+00	1.15E-03
108-90-7	CHLOROBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.80E+02	2.68E-05
74-97-5	CHLOROBROMOMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.50E+02	5.00E-05
75-00-3	CHLOROETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.40E+04	5.36E-07
67-66-3	CHLOROFORM	mg/kg	7.20E-03	1.50E-02	7.50E-03	3.20E+00	2.34E-03
74-87-3	CHLOROMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.10E+02	6.82E-05
156-59-2	CIS-1,2-DICHLOROETHENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.60E+02	4.69E-05
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.80E+01 [3]	4.17E-04
110-82-7	CYCLOHEXANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.50E+03	1.15E-06
124-48-1	DIBROMOCHLOROMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	8.30E+01	9.04E-05
75-71-8	DICHLORODIFLUOROMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	8.70E+01	8.62E-05

TABLE E.7
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
100-41-4	ETHYLBENZENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	5.80E+01	1.29E-04
98-82-8	ISOPROPYLBENZENE (CUMENE)	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.90E+03	3.95E-06
179601-23-1	m,p-XYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	5.50E+02 [4]	1.36E-05
1634-04-4	METHYL TERT-BUTYL ETHER	mg/kg	7.20E-03	1.50E-02	7.50E-03	4.70E+02	1.60E-05
108-87-2	METHYLCYLOHEXANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	NV	N/A
95-47-6	o-XYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.50E+02	1.15E-05
100-42-5	STYRENE (MONOMER)	mg/kg	7.20E-03	1.50E-02	7.50E-03	6.00E+03	1.25E-06
127-18-4	TETRACHLOROETHYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	8.10E+01	9.26E-05
108-88-3	TOLUENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	4.90E+03	1.53E-06
156-60-5	TRANS-1,2-DICHLOROETHENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.60E+03	4.69E-06
10061-02-6	TRANS-1,3-DICHLOROPROPENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	1.80E+01 [3]	4.17E-04
79-01-6	TRICHLOROETHYLENE	mg/kg	7.20E-03	1.50E-02	7.50E-03	4.10E+00	1.83E-03
75-69-4	TRICHLOROFLUOROMETHANE	mg/kg	7.20E-03	1.50E-02	7.50E-03	2.30E+04	3.26E-07
75-01-4	VINYL CHLORIDE	mg/kg	7.20E-03	1.50E-02	7.50E-03	5.90E-01	1.27E-02
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	2.70E-01	5.90E-01	2.95E-01	2.30E+01	1.28E-02
123-91-1	1,4-DIOXANE	mg/kg	1.00E-01	2.40E-01	1.20E-01	5.30E+01	2.26E-03
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	5.20E-01	1.10E+00	5.50E-01	3.10E+03	1.77E-04
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.90E+03	1.55E-04
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	6.30E+03	4.68E-05
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	6.30E+01	4.68E-03
120-83-2	2,4-DICHLOROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.90E+02	1.55E-03
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.30E+03	2.27E-04
51-28-5	2,4-DINITROPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.30E+02	4.23E-03
121-14-2	2,4-DINITROTOLUENE	mg/kg	2.40E-01	5.90E-01	2.95E-01	1.70E+01	1.74E-02
606-20-2	2,6-DINITROTOLUENE	mg/kg	2.40E-01	5.90E-01	2.95E-01	3.60E+00	8.19E-02
91-58-7	2-CHLORONAPHTHALENE	mg/kg	2.70E-01	5.90E-01	2.95E-01	4.80E+03	6.15E-05
95-57-8	2-CHLOROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	3.90E+02	7.56E-04
95-48-7	2-METHLYPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	3.20E+03	1.72E-04
88-74-4	2-NITROANILINE	mg/kg	2.70E-01	5.90E-01	2.95E-01	6.30E+02	4.68E-04
88-75-5	2-NITROPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	NV	N/A
91-94-1	3,3`-DICHLOROBENZIDINE	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.20E+01	4.58E-02
99-09-2	3-NITROANILINE	mg/kg	5.20E-01	1.10E+00	5.50E-01	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	5.10E+00	1.08E-01
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	2.70E-01	5.90E-01	2.95E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	2.70E-01	5.90E-01	2.95E-01	6.30E+03	4.68E-05

TABLE E.7
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
106-47-8	4-CHLOROANILINE	mg/kg	5.20E-01	1.10E+00	5.50E-01	2.70E+01	2.04E-02
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	2.70E-01	5.90E-01	2.95E-01	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	6.30E+03	8.73E-05
100-01-6	4-NITROANILINE	mg/kg	5.20E-01	1.10E+00	5.50E-01	2.50E+02	2.20E-03
100-02-7	4-NITROPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	NV	N/A
98-86-2	ACETOPHENONE	mg/kg	5.20E-01	1.10E+00	5.50E-01	7.80E+03	7.05E-05
1912-24-9	ATRAZINE	mg/kg	5.20E-01	1.10E+00	5.50E-01	2.40E+01	2.29E-02
100-52-7	BENZALDEHYDE	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.70E+03	3.24E-04
92-52-4	BIPHENYL	mg/kg	2.70E-01	5.90E-01	2.95E-01	4.70E+01	6.28E-03
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.90E+02	1.55E-03
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	5.20E-01	1.10E+00	5.50E-01	2.30E+00	2.39E-01
53-70-3	DIBENZ[A,H]ANTHRACENE	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.10E+00	2.68E-01
84-66-2	DIETHYL PHTHALATE	mg/kg	2.70E-01	5.90E-01	2.95E-01	5.10E+04	5.78E-06
131-11-3	DIMETHYL PHTHALATE	mg/kg	2.70E-01	5.90E-01	2.95E-01	NV	N/A
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	5.20E-01	1.10E+00	5.50E-01	6.30E+02	8.73E-04
118-74-1	HEXACHLOROBENZENE	mg/kg	2.70E-01	5.90E-01	2.95E-01	2.10E+00	1.40E-01
87-68-3	HEXACHLOROBUTADIENE	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.20E+01	2.46E-02
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.80E+00	3.06E-01
67-72-1	HEXACHLOROETHANE	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.80E+01	1.64E-02
78-59-1	ISOPHORONE	mg/kg	2.70E-01	5.90E-01	2.95E-01	5.70E+03	5.18E-05
98-95-3	NITROBENZENE	mg/kg	2.40E-01	5.90E-01	2.95E-01	5.10E+01	5.78E-03
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	2.70E-01	5.90E-01	2.95E-01	7.80E-01	3.78E-01
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	2.70E-01	5.90E-01	2.95E-01	1.10E+03	2.68E-04
87-86-5	PENTACHLOROPHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.00E+01	5.50E-02
108-95-2	PHENOL	mg/kg	5.20E-01	1.10E+00	5.50E-01	1.90E+04	2.89E-05
309-00-2	ALDRIN	mg/kg	2.70E-03	5.30E-03	2.65E-03	3.90E-01	6.79E-03
319-84-6	ALPHA-BHC	mg/kg	2.70E-03	5.30E-03	2.65E-03	8.60E-01	3.08E-03
319-85-7	BETA-BHC	mg/kg	2.70E-03	5.30E-03	2.65E-03	3.00E+00	8.83E-04
319-86-8	DELTA-BHC	mg/kg	2.70E-03	5.30E-03	2.65E-03	3.00E+00 [5]	8.83E-04
60-57-1	DIELDRIN	mg/kg	5.20E-03	1.00E-02	5.00E-03	3.40E-01	1.47E-02
959-98-8	ENDOSULFAN I	mg/kg	2.70E-03	5.30E-03	2.65E-03	4.70E+02 [6]	5.64E-06
33213-65-9	ENDOSULFAN II	mg/kg	5.20E-03	1.00E-02	5.00E-03	4.70E+02 [6]	1.06E-05
1031-07-8	ENDOSULFAN SULFATE	mg/kg	5.20E-03	1.00E-02	5.00E-03	4.70E+02 [6]	1.06E-05
72-20-8	ENDRIN	mg/kg	5.20E-03	1.00E-02	5.00E-03	1.90E+01	2.63E-04
7421-93-4	ENDRIN ALDEHYDE	mg/kg	5.20E-03	1.00E-02	5.00E-03	1.90E+01 [7]	2.63E-04

TABLE E.7
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Freshwater Wetland Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
53494-70-5	ENDRIN KETONE	mg/kg	5.20E-03	1.00E-02	5.00E-03	1.90E+01 [7]	2.63E-04
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	2.70E-03	5.30E-03	2.65E-03	5.70E+00	4.65E-04
76-44-8	HEPTACHLOR	mg/kg	2.70E-03	5.30E-03	2.65E-03	1.30E+00	2.04E-03
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	2.70E-03	5.30E-03	2.65E-03	7.00E-01	3.79E-03
72-43-5	METHOXYCHLOR	mg/kg	2.70E-02	5.30E-02	2.65E-02	3.20E+02	8.28E-05
8001-35-2	TOXAPHENE	mg/kg	2.70E-01	5.30E-01	2.65E-01	4.90E+00	5.41E-02
12674-11-2	AROCLOR-1016	mg/kg	5.20E-02	1.10E-01	5.50E-02	4.10E+00	1.34E-02
11104-28-2	AROCLOR-1221	mg/kg	5.20E-02	1.10E-01	5.50E-02	2.00E+00	2.75E-02
11141-16-5	AROCLOR-1232	mg/kg	5.20E-02	1.10E-01	5.50E-02	1.70E+00	3.24E-02
53469-21-9	AROCLOR-1242	mg/kg	5.20E-02	1.10E-01	5.50E-02	2.30E+00	2.39E-02
37324-23-5	AROCLOR-1262	mg/kg	5.20E-02	1.10E-01	5.50E-02	2.30E+00 [8]	2.39E-02
7782-49-2	SELENIUM	mg/kg	3.60E+00	9.60E+00	4.80E+00	3.90E+02	1.23E-02

[1] Set at 1/2 maximum CRQL
[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0)
[3] RSL for unspecified 1,3-dichloropropene
[4] RSL for m-xylene
[5] RSL for hexachlorocyclohexane, technical
[6] RSL for endosulfan
[7] RSL for endrin
[8] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.00E+03	3.13E-04
79-34-5	**1,1,2,2-TETRACHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.60E-01**	**3.29E+00**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.00E+04	2.50E-04
79-00-5	**1,1,2-TRICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.10E-01**	**6.10E+00**
75-34-3	1,1-DICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+01	8.93E-02
75-35-4	1,1-DICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+02	8.93E-03
87-61-6	1,2,3-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.00E+00	3.57E-01
120-82-1	1,2,4-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.30E-03**	**7.58E+02**
106-93-4	**1,2-DIBROMOETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.50E-02**	**3.33E+01**
95-50-1	1,2-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.00E+02	8.33E-03
107-06-2	**1,2-DICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
78-87-5	**1,2-DICHLOROPROPANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
541-73-1	1,3-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.20E+02	7.81E-03
106-46-7	1,4-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.80E+00	5.21E-01
78-93-3	2-BUTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	5.60E+03	8.93E-04
591-78-6	2-HEXANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
108-10-1	4-METHYL-2-PENTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	6.30E+03	7.94E-04
67-64-1	ACETONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.40E+04	3.57E-04
71-43-2	BENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+00	5.43E-01
75-27-4	**BROMODICHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.30E+00**	**1.92E+00**
75-25-2	BROMOFORM	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
74-83-9	BROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+00	3.33E-01
75-15-0	CARBON DISULFIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+02	3.09E-03
56-23-5	**CARBON TETRACHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.30E+00**	**1.09E+00**
108-90-7	CHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.80E+01	3.21E-02
74-97-5	CHLOROBROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.30E+01	3.01E-02
75-00-3	CHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.10E+04	1.19E-04
67-66-3	**CHLOROFORM**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.20E+00**	**1.14E+00**
74-87-3	CHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
156-59-2	CIS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01
110-82-7	CYCLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.30E+04	1.92E-04
124-48-1	DIBROMOCHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.00E+00	6.25E-01
75-71-8	DICHLORODIFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+02	1.25E-02

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
100-41-4	ETHYLBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+01	1.67E-01
98-82-8	ISOPROPYLBENZENE (CUMENE)	ug/L	5.00E+00	5.00E+00	2.50E+00	4.50E+02	5.56E-03
179601-23-1	m,p-XYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02 [4]	1.32E-02
79-20-9	METHYL ACETATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+04	1.25E-04
1634-04-4	METHYL TERT-BUTYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
108-87-2	METHYLCYLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-09-2	METHYLENE CHLORIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
95-47-6	o-XYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
100-42-5	STYRENE (MONOMER)	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
127-18-4	TETRACHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	6.90E+00	3.62E-01
108-88-3	TOLUENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.10E+02	4.90E-03
156-60-5	TRANS-1,2-DICHLOROETHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+02	1.79E-02
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.70E+00 [3]	5.32E-01
79-01-6	TRICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+00	8.93E-01
75-69-4	TRICHLOROFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.20E+03	4.81E-04
75-01-4	**VINYL CHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.90E-01**	**1.32E+01**
95-94-3	**1,2,4,5-TETRACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
123-91-1	1,4-DIOXANE	ug/L	2.00E+00	2.00E+00	1.00E+00	4.60E+00	2.17E-01
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	ug/L	1.00E+01	1.00E+01	5.00E+00	7.10E+02	7.04E-03
58-90-2	2,3,4,6-TETRACHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	2.40E+02	1.04E-02
95-95-4	2,4,5-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+03	2.08E-03
88-06-2	2,4,6-TRICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+01	2.08E-01
120-83-2	2,4-DICHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	4.60E+01	5.43E-02
105-67-9	2,4-DIMETHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+02	6.94E-03
51-28-5	2,4-DINITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	3.90E+01	1.28E-01
121-14-2	**2,4-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.10E+00**	**2.27E+00**
606-20-2	**2,6-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**4.90E-01**	**5.10E+00**
91-58-7	2-CHLORONAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.50E+02	3.33E-03
95-57-8	2-CHLOROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	8.10E+01	3.09E-02
95-48-7	2-METHLYPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	9.30E+02	5.38E-03
91-57-6	2-METHYLNAPHTHALENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.60E+01	6.94E-02
88-74-4	2-NITROANILINE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+02	1.32E-02
88-75-5	2-NITROPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
91-94-1	**3,3`-DICHLOROBENZIDINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**2.10E-01**	**2.38E+01**
99-09-2	3-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
534-52-1	**4,6-DINITRO-2-METHYLPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.50E+00**	**3.33E+00**
101-55-3	4-BROMOPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	ug/L	5.00E+00	5.00E+00	2.50E+00	1.40E+03	1.79E-03
106-47-8	**4-CHLOROANILINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.70E+00**	**1.35E+00**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
106-44-5	4-METHLYPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+03	2.63E-03
100-01-6	4-NITROANILINE	ug/L	1.00E+01	1.00E+01	5.00E+00	3.80E+01	1.32E-01
100-02-7	4-NITROPHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
83-32-9	ACENAPHTHENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
208-96-8	ACENAPHTHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.30E+02	4.72E-03
98-86-2	ACETOPHENONE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+03	2.63E-03
120-12-7	ANTHRACENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.80E+03	1.39E-03
1912-24-9	**ATRAZINE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.00E+00**	**1.67E+00**
100-52-7	BENZALDEHYDE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.90E+02	2.63E-02
56-55-3	**BENZO[A]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
50-32-8	**BENZO[A]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
205-99-2	**BENZO[B]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
191-24-2	BENZO[G,H,I]PERYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
207-08-9	**BENZO[K]FLUORANTHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
85-68-7	BENZYL BUTYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+03	1.67E-03
92-52-4	**BIPHENYL**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.30E-01**	**3.01E+00**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.90E+01	4.24E-02
111-44-4	**BIS(2-CHLOROETHYL) ETHER**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.40E-01**	**3.57E+01**
105-60-2	CAPROLACTAM	ug/L	1.00E+01	1.00E+01	5.00E+00	9.90E+03	5.05E-04
86-74-8	CARBAZOLE	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
218-01-9	**CHRYSENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.80E-02**	**1.39E+02**
53-70-3	**DIBENZ[A,H]ANTHRACENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
132-64-9	DIBENZOFURAN	ug/L	5.00E+00	5.00E+00	2.50E+00	7.90E+00	3.16E-01
84-66-2	DIETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.50E+04	1.67E-04
131-11-3	DIMETHYL PHTHALATE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.70E+05	9.26E-06
117-84-0	DI-N-OCTYL PHTHALATE	ug/L	1.00E+01	1.00E+01	5.00E+00	2.00E+02	2.50E-02
206-44-0	FLUORANTHENE	ug/L	1.00E+01	1.00E+01	5.00E+00	1.30E+02	3.85E-02
86-73-7	FLUORENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.90E+02	8.62E-03
118-74-1	**HEXACHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
87-68-3	**HEXACHLOROBUTADIENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
67-72-1	HEXACHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+00	7.58E-01
193-39-5	**INDENO[1,2,3-CD]PYRENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.80E-02**	**6.58E+01**
78-59-1	ISOPHORONE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.50E+02	7.14E-03
91-20-3	**NAPHTHALENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E+00**	**1.47E+00**
98-95-3	**NITROBENZENE**	**ug/L**	**2.00E-01**	**5.00E+00**	**2.50E+00**	**1.40E+00**	**1.79E+00**
621-64-7	**N-NITROSODI-N-PROPYLAMINE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**5.00E-02**	**5.00E+01**
86-30-6	N-NITROSODIPHENYLAMINE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+01	7.58E-02
87-86-5	**PENTACHLOROPHENOL**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**4.10E-01**	**1.22E+01**
85-01-8	PHENANTHRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
108-95-2	PHENOL	ug/L	1.00E+01	1.00E+01	5.00E+00	5.80E+03	8.62E-04
129-00-0	PYRENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02
72-54-8	**4,4'-DDD**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**3.10E-03**	**1.61E+01**
72-55-9	**4,4'-DDE**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
50-29-3	**4,4'-DDT**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**2.20E-03**	**2.27E+01**
309-00-2	**ALDRIN**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**4.90E-04**	**5.10E+01**
319-84-6	ALPHA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.60E-02	9.62E-01
319-85-7	BETA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	9.10E-02	2.75E-01
12789-03-6	**CHLORDANE [5]**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**8.00E-03**	**6.25E+00**
319-86-8	DELTA-BHC	ug/L	5.00E-02	5.00E-02	2.50E-02	2.50E-01 [6]	1.00E-01
60-57-1	**DIELDRIN**	**ug/L**	**1.00E-01**	**1.00E-01**	**5.00E-02**	**5.20E-04**	**9.62E+01**
959-98-8	ENDOSULFAN I	ug/L	5.00E-02	5.00E-02	2.50E-02	6.20E+01	4.03E-04
33213-65-9	ENDOSULFAN II	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04
1031-07-8	ENDOSULFAN SULFATE	ug/L	1.00E-01	1.00E-01	5.00E-02	6.20E+01	8.06E-04
72-20-8	ENDRIN	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
7421-93-4	ENDRIN ALDEHYDE	ug/L	1.00E-01	1.00E-01	5.00E-02	2.90E-01	1.72E-01
53494-70-5	ENDRIN KETONE	ug/L	1.00E-01	1.00E-01	5.00E-02	5.90E-02	8.47E-01
58-89-9	GAMMA-BHC (LINDANE)	ug/L	5.00E-02	5.00E-02	2.50E-02	4.20E-01	5.95E-02
76-44-8	**HEPTACHLOR**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**7.90E-04**	**3.16E+01**
1024-57-3	**HEPTACHLOR EPOXIDE**	**ug/L**	**5.00E-02**	**5.00E-02**	**2.50E-02**	**3.90E-04**	**6.41E+01**
72-43-5	METHOXYCHLOR	ug/L	5.00E-01	5.00E-01	2.50E-01	3.70E+01	6.76E-03
8001-35-2	**TOXAPHENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-03**	**8.93E+02**
12674-11-2	AROCLOR-1016	ug/L	1.00E+00	1.00E+00	5.00E-01	1.40E+00	3.57E-01
11104-28-2	**AROCLOR-1221**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**
11141-16-5	**AROCLOR-1232**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**4.70E-02**	**1.06E+01**

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
53469-21-9	**AROCLOR-1242**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
12672-29-6	**AROCLOR-1248**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11097-69-1	**AROCLOR-1254**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
11096-82-5	**AROCLOR-1260**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02**	**6.41E+00**
37324-23-5	**AROCLOR-1262**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
11100-14-4	**AROCLOR-1268**	**ug/L**	**1.00E+00**	**1.00E+00**	**5.00E-01**	**7.80E-02 [7]**	**6.41E+00**
99-35-4	1,3,5-TRINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	5.90E+02	1.69E-04
118-96-7	2,4,6-TRINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	9.80E+00	1.02E-02
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
88-72-2	2-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	3.10E+00	8.06E-02
99-08-1	3-NITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	1.70E+00	5.88E-02
19406-51-0	4-AMINO-2,6-DINITROTOLUENE	ug/L	2.00E-01	2.00E-01	1.00E-01	3.90E+01	2.56E-03
99-99-0	4-NITROTOLUENE	ug/L	5.00E-01	5.00E-01	2.50E-01	4.30E+01	5.81E-03
99-65-0	M-DINITROBENZENE	ug/L	2.00E-01	2.00E-01	1.00E-01	2.00E+00	5.00E-02
2691-41-0	OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE (HMX)	ug/L	2.00E-01	2.00E-01	1.00E-01	1.00E+03	1.00E-04
121-82-4	RDX	ug/L	2.00E-01	2.00E-01	1.00E-01	7.00E+00	1.43E-02
7440-36-0	**ANTIMONY**	**ug/L**	**6.00E+01**	**6.00E+01**	**3.00E+01**	**5.60E+00**	**5.36E+00**
7440-41-7	BERYLLIUM	ug/L	5.00E+00	5.00E+00	2.50E+00	2.50E+01	1.00E-01
7440-43-9	CADMIUM	ug/L	5.00E+00	5.00E+00	2.50E+00	5.00E+00	5.00E-01
18540-29-9	**CHROMIUM (HEXAVALENT COMPOUNDS)**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.50E-01**	**1.43E+01**
7440-48-4	**COBALT**	**ug/L**	**5.00E+01**	**5.00E+01**	**2.50E+01**	**6.00E+00**	**4.17E+00**
57-12-5	**CYANIDE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**1.50E+00**	**3.33E+00**
7439-97-6	MERCURY	ug/L	2.00E-01	2.00E-01	1.00E-01	6.30E-01	1.59E-01
7440-22-4	SILVER	ug/L	1.00E+01	1.00E+01	5.00E+00	9.40E+01	5.32E-02
14733-03-0	**BISMUTH-214**	**pCi/L**	**5.40E+00**	**1.00E+01**	**5.00E+00**	**1.96E-01**	**2.55E+01**

TABLE E.8
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Paradise Creek Surface Water
Exposure Medium: Surface Water

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
15067-28-4	**LEAD-214**	**pCi/L**	**5.37E+00**	**1.00E+01**	**5.00E+00**	**1.96E-01**	**2.55E+01**
10098-97-2	STRONTIUM-90	pCi/L	3.00E+00	3.00E+00	1.50E+00	7.07E+00	2.12E-01

[1] Set at 1/2 maximum CRQL

[2] The lower of the EPA Regional Screening Level (RSL) for Tapwater November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0); Code of Virginia, Water Quality Standards, Public Water Supply (96VAC25-260-140), or Code of Virginia, Water Quality Standards, All Other Surface Waters (96VAC25-260-140)

[3] RSL for unspecified 1,3-dichloropropene

[4] RSL for xylenes

[5] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[6] RSL for hexachlorocyclohexane, technical

[7] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.9
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E-02	**2.97E+01**
123-91-1	1,4-DIOXANE	mg/kg	6.90E-01	8.60E-01	4.30E-01	6.95E-02	**6.19E+00**
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	3.30E+00	4.10E+00	2.05E+00	4.72E+00	4.34E-01
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E+00	2.97E-01
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E+01	8.90E-02
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E-01	**8.90E+00**
120-83-2	2,4-DICHLOROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E-01	**2.97E+00**
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	2.36E+00	4.45E-01
51-28-5	2,4-DINITROPHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	2.36E-01	**8.69E+00**
121-14-2	2,4-DINITROTOLUENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	2.24E-02	**3.79E+01**
606-20-2	2,6-DINITROTOLUENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.63E-03	**1.84E+02**
91-58-7	2-CHLORONAPHTHALENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	9.45E+00	1.11E-01
95-57-8	2-CHLOROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	5.91E-01	**1.78E+00**
95-48-7	2-METHLYPHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	5.91E+00	3.47E-01
91-57-6	2-METHYLNAPHTHALENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	4.72E-01	**2.22E+00**
88-74-4	2-NITROANILINE	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E+00	8.90E-01
88-75-5	2-NITROPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	NV	N/A
91-94-1	3,3`-DICHLOROBENZIDINE	mg/kg	3.30E+00	3.30E+00	1.65E+00	1.54E-02	**1.07E+02**
99-09-2	3-NITROANILINE	mg/kg	3.30E+00	4.10E+00	2.05E+00	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	9.45E-03	**2.17E+02**
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	1.70E+00	2.10E+00	1.05E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E+01	8.90E-02
106-47-8	4-CHLOROANILINE	mg/kg	3.30E+00	4.10E+00	2.05E+00	3.48E-02	**5.89E+01**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	1.70E+00	2.10E+00	1.05E+00	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	1.18E+01	1.74E-01
100-01-6	4-NITROANILINE	mg/kg	3.30E+00	4.10E+00	2.05E+00	3.48E-01	**5.89E+00**
100-02-7	4-NITROPHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	NV	N/A
83-32-9	ACENAPHTHENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	7.09E+00	1.48E-01
208-96-8	ACENAPHTHYLENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	7.09E+00 [3]	1.48E-01
98-86-2	ACETOPHENONE	mg/kg	3.30E+00	3.30E+00	1.65E+00	1.18E+01	1.40E-01

TABLE E.9
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
120-12-7	ANTHRACENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E+01	2.97E-02
1912-24-9	ATRAZINE	mg/kg	3.30E+00	4.10E+00	2.05E+00	3.02E-02	**6.79E+01**
100-52-7	BENZALDEHYDE	mg/kg	3.30E+00	4.10E+00	2.05E+00	1.74E+00	**1.18E+00**
56-55-3	BENZO[A]ANTHRACENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-02	**1.51E+01**
50-32-8	BENZO[A]PYRENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-03	**1.51E+02**
205-99-2	BENZO[B]FLUORANTHENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-02	**1.51E+01**
191-24-2	BENZO[G,H,I]PERYLENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E+00 [4]	2.97E-01
207-08-9	BENZO[K]FLUORANTHENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-01	**1.51E+00**
85-68-7	BENZYL BUTYL PHTHALATE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.66E+00	2.87E-01
92-52-4	BIPHENYL	mg/kg	1.70E+00	2.10E+00	1.05E+00	8.69E-01	**1.21E+00**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E-01	**2.97E+00**
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	3.30E+00	4.10E+00	2.05E+00	6.32E-03	**3.24E+02**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	1.70E+00	2.10E+00	1.05E+00	4.97E-01	**2.11E+00**
105-60-2	CAPROLACTAM	mg/kg	3.30E+00	4.10E+00	2.05E+00	5.91E+01	3.47E-02
86-74-8	CARBAZOLE	mg/kg	3.30E+00	4.10E+00	2.05E+00	NV	N/A
218-01-9	CHRYSENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E+00	1.51E-01
53-70-3	DIBENZ[A,H]ANTHRACENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-03	**1.51E+02**
132-64-9	DIBENZOFURAN	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E-01	**8.90E+00**
84-66-2	DIETHYL PHTHALATE	mg/kg	1.70E+00	2.10E+00	1.05E+00	9.45E+01	1.11E-02
131-11-3	DIMETHYL PHTHALATE	mg/kg	1.70E+00	2.10E+00	1.05E+00	NV	N/A
84-74-2	DI-N-BUTYL PHTHALATE	mg/kg	1.70E+00	2.10E+00	1.05E+00	1.18E+01	8.90E-02
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	3.30E+00	4.10E+00	2.05E+00	1.18E+00	**1.74E+00**
206-44-0	FLUORANTHENE	mg/kg	3.30E+00	4.10E+00	2.05E+00	4.72E+00	4.34E-01
86-73-7	FLUORENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	4.72E+00	2.22E-01
118-74-1	HEXACHLOROBENZENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	4.35E-03	**2.41E+02**
87-68-3	HEXACHLOROBUTADIENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	8.91E-02	**1.18E+01**
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	3.30E+00	3.30E+00	1.65E+00	7.09E-01	**2.33E+00**
67-72-1	HEXACHLOROETHANE	mg/kg	1.70E+00	1.70E+00	8.50E-01	8.27E-02	**1.03E+01**
193-39-5	INDENO[1,2,3-CD]PYRENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	6.95E-02	**1.51E+01**
78-59-1	ISOPHORONE	mg/kg	1.70E+00	2.10E+00	1.05E+00	7.32E+00	1.43E-01

TABLE E.9
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
91-20-3	NAPHTHALENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	2.36E+00	4.45E-01
98-95-3	NITROBENZENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	2.36E-01	**3.60E+00**
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	1.70E+00	1.70E+00	8.50E-01	9.93E-04	**8.56E+02**
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.42E+00	5.99E-01
85-01-8	PHENANTHRENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E+00 [4]	2.97E-01
108-95-2	PHENOL	mg/kg	3.30E+00	4.10E+00	2.05E+00	3.54E+01	5.79E-02
129-00-0	PYRENE	mg/kg	1.70E+00	2.10E+00	1.05E+00	3.54E+00	2.97E-01
309-00-2	ALDRIN	mg/kg	8.30E-03	8.50E-03	4.25E-03	4.09E-04	**1.04E+01**
319-84-6	ALPHA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	1.10E-03	**3.86E+00**
319-85-7	BETA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	3.86E-03	**1.10E+00**
319-86-8	DELTA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	3.86E-03 [5]	**1.10E+00**
959-98-8	ENDOSULFAN I	mg/kg	8.30E-03	8.50E-03	4.25E-03	7.09E-01 [6]	5.99E-03
33213-65-9	ENDOSULFAN II	mg/kg	1.60E-02	1.60E-02	8.00E-03	7.09E-01 [6]	1.13E-02
1031-07-8	ENDOSULFAN SULFATE	mg/kg	1.60E-02	1.60E-02	8.00E-03	7.09E-01 [6]	1.13E-02
72-20-8	ENDRIN	mg/kg	1.60E-02	1.60E-02	8.00E-03	3.54E-02	2.26E-01
7421-93-4	ENDRIN ALDEHYDE	mg/kg	1.60E-02	1.60E-02	8.00E-03	3.54E-02 [7]	2.26E-01
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	8.30E-03	8.50E-03	4.25E-03	6.32E-03	6.72E-01
76-44-8	HEPTACHLOR	mg/kg	8.30E-03	8.50E-03	4.25E-03	1.54E-03	**2.76E+00**
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	8.30E-03	8.50E-03	4.25E-03	7.64E-04	**5.56E+00**
72-43-5	METHOXYCHLOR	mg/kg	8.30E-02	8.50E-02	4.25E-02	5.91E-01	7.19E-02
8001-35-2	TOXAPHENE	mg/kg	8.30E-01	8.50E-01	4.25E-01	6.32E-03	**6.72E+01**
12674-11-2	AROCLOR-1016	mg/kg	3.20E-02	3.30E-02	1.65E-02	8.27E-03	**2.00E+00**
11104-28-2	AROCLOR-1221	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03	**4.74E+00**
11141-16-5	AROCLOR-1232	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03	**4.74E+00**
53469-21-9	AROCLOR-1242	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03	**4.74E+00**
12672-29-6	AROCLOR-1248	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03	**4.74E+00**
11096-82-5	AROCLOR-1260	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03	**4.74E+00**
37324-23-5	AROCLOR-1262	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03 [8]	**4.74E+00**
11100-14-4	PCB-1268 (AROCLOR 1268)	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.48E-03 [8]	**4.74E+00**
7440-36-0	ANTIMONY	mg/kg	9.70E-01	1.00E+00	5.00E-01	4.72E-02	**1.06E+01**

TABLE E.9
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
7440-41-7	BERYLLIUM	mg/kg	4.90E-01	5.00E-01	2.50E-01	2.36E-01	**1.06E+00**
7440-43-9	CADMIUM	mg/kg	4.90E-01	5.00E-01	2.50E-01	1.18E-01	**2.12E+00**
7439-97-6	MERCURY	mg/kg	8.50E-02	9.60E-02	4.80E-02	1.18E-02 [9]	**4.07E+00**
7440-22-4	SILVER	mg/kg	4.90E-01	5.00E-01	2.50E-01	5.91E-01	4.23E-01
7440-28-0	THALLIUM	mg/kg	4.90E-01	5.00E-01	2.50E-01	1.18E-03	**2.12E+02**
7440-62-2	VANADIUM (FUME OR DUST)	mg/kg	2.40E+00	2.50E+00	1.25E+00	5.95E-01	**2.10E+00**

[1] Set at 1/2 maximum CRQL

[5] The lower of the site-specific screening level calculated for the child or adult receptor using toxicology data presented in the EPA RSL tables and the site exposure assumptions presented in Tables 4.15 and 4.17 using the calculator available at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

Screening levels based on non-cancer (n) based on HQ = 0.1; screening levels based on cancer (c) based on cancer risk = 1x10-6. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml (chemical hazards)

[3] Screening value for acenaphthene used as a proxy

[4] Screening value for pyrene used as a proxy

[5] Screening value for hexachlorocyclohexane, technical

[6] Screening value for endosulfan

[7] Screening value for endrin

[8] Screening value for Aroclor-1260 used as a proxy

[9] Screening value for methyl mercury

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value

N/A = Not applicable

TABLE E.10
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E-02	**1.87E+01**
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	3.20E+00	3.30E+00	1.65E+00	6.07E+00	2.72E-01
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E+00	1.87E-01
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E+01	5.59E-02
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E-01	**5.59E+00**
120-83-2	2,4-DICHLOROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E-01	**1.87E+00**
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	3.03E+00	2.81E-01
51-28-5	2,4-DINITROPHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	3.03E-01	**5.45E+00**
121-14-2	2,4-DINITROTOLUENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	2.14E-02	**3.97E+01**
606-20-2	2,6-DINITROTOLUENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.42E-03	**1.92E+02**
91-58-7	2-CHLORONAPHTHALENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.21E+01	7.02E-02
95-57-8	2-CHLOROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	7.58E-01	**1.12E+00**
95-48-7	2-METHLYPHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	7.58E+00	2.18E-01
91-57-6	2-METHYLNAPHTHALENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.07E-01	**1.40E+00**
88-74-4	2-NITROANILINE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E+00	5.59E-01
88-75-5	2-NITROPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	NV	N/A
91-94-1	3,3`-DICHLOROBENZIDINE	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.47E-02	**1.12E+02**
99-09-2	3-NITROANILINE	mg/kg	3.20E+00	3.30E+00	1.65E+00	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.21E-02	**1.36E+02**
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	1.70E+00	1.70E+00	8.50E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E+01	5.59E-02
106-47-8	4-CHLOROANILINE	mg/kg	3.20E+00	3.30E+00	1.65E+00	3.32E-02	**4.97E+01**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	1.70E+00	1.70E+00	8.50E-01	NV	N/A
106-44-5	4-METHLYPHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.52E+01	1.09E-01
100-01-6	4-NITROANILINE	mg/kg	3.20E+00	3.30E+00	1.65E+00	3.32E-01	**4.97E+00**
100-02-7	4-NITROPHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	NV	N/A
83-32-9	ACENAPHTHENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	9.10E+00	9.34E-02
208-96-8	ACENAPHTHYLENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	9.10E+00 [3]	9.34E-02

TABLE E.10
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
98-86-2	ACETOPHENONE	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.52E+01	1.09E-01
120-12-7	ANTHRACENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E+01	1.87E-02
1912-24-9	ATRAZINE	mg/kg	3.20E+00	3.30E+00	1.65E+00	2.89E-02	**5.71E+01**
100-52-7	BENZALDEHYDE	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.66E+00	9.94E-01
56-55-3	BENZO[A]ANTHRACENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E-02	**1.28E+01**
50-32-8	BENZO[A]PYRENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E-03	**1.28E+02**
191-24-2	BENZO[G,H,I]PERYLENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E+00 [4]	1.87E-01
207-08-9	BENZO[K]FLUORANTHENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E-01	**1.28E+00**
85-68-7	BENZYL BUTYL PHTHALATE	mg/kg	1.70E+00	1.70E+00	8.50E-01	3.49E+00	2.44E-01
92-52-4	BIPHENYL	mg/kg	1.70E+00	1.70E+00	8.50E-01	8.30E-01	**1.02E+00**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E-01	**1.87E+00**
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	3.20E+00	3.30E+00	1.65E+00	6.03E-03	**2.74E+02**
117-81-7	BIS(2-ETHYLHEXYL) PHTHALATE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.74E-01	**1.79E+00**
105-60-2	CAPROLACTAM	mg/kg	3.20E+00	3.30E+00	1.65E+00	7.58E+01	2.18E-02
86-74-8	CARBAZOLE	mg/kg	3.20E+00	3.30E+00	1.65E+00	NV	N/A
218-01-9	CHRYSENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E+00	1.28E-01
53-70-3	DIBENZ[A,H]ANTHRACENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E-03	**1.28E+02**
132-64-9	DIBENZOFURAN	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E-01	**5.59E+00**
84-66-2	DIETHYL PHTHALATE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.21E+02	7.02E-03
131-11-3	DIMETHYL PHTHALATE	mg/kg	1.70E+00	1.70E+00	8.50E-01	NV	N/A
84-74-2	DI-N-BUTYL PHTHALATE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.52E+01	5.59E-02
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	3.20E+00	3.30E+00	1.65E+00	1.52E+00	**1.09E+00**
206-44-0	FLUORANTHENE	mg/kg	3.20E+00	3.30E+00	1.65E+00	6.07E+00	2.72E-01
86-73-7	FLUORENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.07E+00	1.40E-01
118-74-1	HEXACHLOROBENZENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.15E-03	**2.05E+02**
87-68-3	HEXACHLOROBUTADIENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	8.51E-02	**9.99E+00**
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	3.20E+00	3.30E+00	1.65E+00	9.10E-01	**1.81E+00**
67-72-1	HEXACHLOROETHANE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.06E-01	**8.02E+00**

TABLE E.10
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
193-39-5	INDENO[1,2,3-CD]PYRENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.64E-02	**1.28E+01**
78-59-1	ISOPHORONE	mg/kg	1.70E+00	1.70E+00	8.50E-01	6.99E+00	1.22E-01
91-20-3	NAPHTHALENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	3.03E+00	2.81E-01
98-95-3	NITROBENZENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	3.03E-01	**2.81E+00**
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	1.70E+00	1.70E+00	8.50E-01	9.48E-04	**8.97E+02**
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	1.70E+00	1.70E+00	8.50E-01	1.35E+00	6.30E-01
85-01-8	PHENANTHRENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E+00 [4]	1.87E-01
108-95-2	PHENOL	mg/kg	3.20E+00	3.30E+00	1.65E+00	4.55E+01	3.63E-02
129-00-0	PYRENE	mg/kg	1.70E+00	1.70E+00	8.50E-01	4.55E+00	1.87E-01
319-84-6	ALPHA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	1.05E-03	**4.05E+00**
319-85-7	BETA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	3.69E-03	**1.15E+00**
319-86-8	DELTA-BHC	mg/kg	8.30E-03	8.50E-03	4.25E-03	3.69E-03 [5]	**1.15E+00**
959-98-8	ENDOSULFAN I	mg/kg	8.30E-03	8.50E-03	4.25E-03	9.10E-01 [6]	4.67E-03
33213-65-9	ENDOSULFAN II	mg/kg	1.60E-02	1.60E-02	8.00E-03	9.10E-01 [6]	8.79E-03
1031-07-8	ENDOSULFAN SULFATE	mg/kg	1.60E-02	1.60E-02	8.00E-03	9.10E-01 [6]	8.79E-03
7421-93-4	ENDRIN ALDEHYDE	mg/kg	1.60E-02	1.60E-02	8.00E-03	4.55E-02 [7]	1.76E-01
53494-70-5	ENDRIN KETONE	mg/kg	1.60E-02	1.60E-02	8.00E-03	4.55E-02 [7]	1.76E-01
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	8.30E-03	8.50E-03	4.25E-03	6.03E-03	7.05E-01
76-44-8	HEPTACHLOR	mg/kg	8.30E-03	8.50E-03	4.25E-03	1.47E-03	**2.89E+00**
72-43-5	METHOXYCHLOR	mg/kg	8.30E-02	8.50E-02	4.25E-02	7.58E-01	5.61E-02
8001-35-2	TOXAPHENE	mg/kg	8.30E-01	8.50E-01	4.25E-01	6.03E-03	**7.05E+01**
12674-11-2	AROCLOR-1016	mg/kg	3.20E-02	3.30E-02	1.65E-02	1.06E-02	**1.56E+00**
11104-28-2	AROCLOR-1221	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03	**4.97E+00**
11141-16-5	AROCLOR-1232	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03	**4.97E+00**
53469-21-9	AROCLOR-1242	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03	**4.97E+00**
12672-29-6	AROCLOR-1248	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03	**4.97E+00**
11096-82-5	AROCLOR-1260	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03	**4.97E+00**
37324-23-5	AROCLOR-1262	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03 [8]	**4.97E+00**

TABLE E.10
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
11100-14-4	PCB-1268 (AROCLOR 1268)	mg/kg	3.20E-02	3.30E-02	1.65E-02	3.32E-03 [8]	**4.97E+00**
7440-36-0	ANTIMONY	mg/kg	9.60E-01	9.80E-01	4.90E-01	6.07E-02	**8.07E+00**
7440-39-3	BARIUM	mg/kg	4.80E+00	4.90E+00	2.45E+00	3.03E+01	8.09E-02
7440-41-7	BERYLLIUM	mg/kg	4.80E-01	4.90E-01	2.45E-01	3.03E-01	8.09E-01
7782-49-2	SELENIUM	mg/kg	2.40E+00	2.50E+00	1.25E+00	7.58E-01	**1.65E+00**
7440-22-4	SILVER	mg/kg	4.80E-01	4.90E-01	2.45E-01	7.58E-01	3.23E-01
7440-28-0	THALLIUM	mg/kg	4.80E-01	4.90E-01	2.45E-01	1.52E-03	**1.61E+02**
7440-31-5	TIN	mg/kg	4.80E-01	4.90E-01	2.45E-01	9.10E+01	2.69E-03
7440-62-2	VANADIUM (FUME OR DUST)	mg/kg	2.40E+00	2.50E+00	1.25E+00	7.65E-01	**1.63E+00**

[1] Set at 1/2 maximum CRQL

[5] The lower of the site-specific screening level calculated for the child or adult receptor using toxicology data presented in the EPA RSL tables and the site exposure assumptions presented in Tables 4.15 and 4.17 using the calculator available at: https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search.

Screening levels based on non-cancer (n) based on HQ = 0.1; screening levels based on cancer (c) based on cancer risk = 1x10-6. Available: http://epa-prgs.ornl.gov/chemicals/index.shtml (chemical hazards)

[3] Screening value for acenaphthene used as a proxy

[4] Screening value for pyrene used as a proxy

[5] Screening value for hexachlorocyclohexane, technical

[6] Screening value for endosulfan

[7] Screening value for endrin

[8] Screening value for Aroclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value

N/A = Not applicable

TABLE E.11
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.00E+02	3.13E-03
79-34-5	**1,1,2,2-TETRACHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.60E-02**	**3.29E+01**
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.00E+03	2.50E-03
79-00-5	**1,1,2-TRICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.10E-02**	**6.10E+01**
75-34-3	1,1-DICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+00	8.93E-01
75-35-4	1,1-DICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.80E+01	8.93E-02
87-61-6	**1,2,3-TRICHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.00E-01**	**3.57E+00**
120-82-1	**1,2,4-TRICHLOROBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.00E-01**	**6.25E+00**
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**3.30E-04**	**7.58E+03**
106-93-4	**1,2-DIBROMOETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.50E-03**	**3.33E+02**
95-50-1	1,2-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.00E+01	8.33E-02
107-06-2	**1,2-DICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.70E-01**	**1.47E+01**
78-87-5	**1,2-DICHLOROPROPANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.40E-01**	**1.79E+01**
591-78-6	**2-HEXANONE**	**ug/L**	**1.00E+01**	**1.00E+01**	**5.00E+00**	**3.80E+00**	**1.32E+00**
108-10-1	4-METHYL-2-PENTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	6.30E+02	7.94E-03
71-43-2	**BENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.60E-01**	**5.43E+00**
75-27-4	**BROMODICHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.30E-01**	**1.92E+01**
75-25-2	BROMOFORM	ug/L	5.00E+00	5.00E+00	2.50E+00	3.30E+00	7.58E-01
74-83-9	**BROMOMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.50E-01**	**3.33E+00**
56-23-5	**CARBON TETRACHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.60E-01**	**5.43E+00**
74-97-5	CHLOROBROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	8.30E+00	3.01E-01
67-66-3	**CHLOROFORM**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.20E-01**	**1.14E+01**
74-87-3	CHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.90E+01	1.32E-01
10061-01-5	**CIS-1,3-DICHLOROPROPYLENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.70E-01 [3]**	**5.32E+00**
110-82-7	CYCLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.30E+03	1.92E-03
124-48-1	**DIBROMOCHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.70E-01**	**2.87E+00**
75-71-8	DICHLORODIFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.00E+01	1.25E-01
100-41-4	**ETHYLBENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.50E+00**	**1.67E+00**
98-82-8	ISOPROPYLBENZENE (CUMENE)	ug/L	5.00E+00	5.00E+00	2.50E+00	4.50E+01	5.56E-02
108-87-2	METHYLCYLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-09-2	METHYLENE CHLORIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.10E+01	2.27E-01
100-42-5	STYRENE (MONOMER)	ug/L	5.00E+00	5.00E+00	2.50E+00	1.20E+02	2.08E-02

TABLE E.11
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
127-18-4	TETRACHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.10E+00	6.10E-01
10061-02-6	**TRANS-1,3-DICHLOROPROPENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.70E-01 [3]**	**5.32E+00**
79-01-6	**TRICHLOROETHYLENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.80E-01**	**8.93E+00**
75-69-4	TRICHLOROFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.20E+02	4.81E-03
95-94-3	**1,2,4,5-TETRACHLOROBENZENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.70E-01**	**1.67E+01**
123-91-1	**1,4-DIOXANE**	**ug/L**	**2.00E+00**	**2.00E+00**	**1.00E+00**	**4.60E-01**	**2.17E+00**
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	ug/L	1.00E+01	1.00E+01	5.00E+00	7.10E+01	7.04E-02
39638-32-9	2,2-OXYBIS(2-CHLOROPROPANE)	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
58-90-2	2,3,4,6-TETRACHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	2.40E+01	1.18E-01
95-95-4	2,4,5-TRICHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	1.20E+02	2.37E-02
88-06-2	**2,4,6-TRICHLOROPHENOL**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.20E+00**	**2.37E+00**
120-83-2	2,4-DICHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	4.60E+00	6.17E-01
105-67-9	2,4-DIMETHYLPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	3.60E+01	7.89E-02
51-28-5	**2,4-DINITROPHENOL**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**3.90E+00**	**1.28E+00**
121-14-2	**2,4-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.68E+00**	**2.84E+00**	**2.40E-01**	**1.18E+01**
606-20-2	**2,6-DINITROTOLUENE**	**ug/L**	**2.00E-01**	**5.68E+00**	**2.84E+00**	**4.90E-02**	**5.80E+01**
91-58-7	2-CHLORONAPHTHALENE	ug/L	4.72E+00	5.68E+00	2.84E+00	7.50E+01	3.79E-02
95-57-8	2-CHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	9.10E+00	3.12E-01
95-48-7	2-METHLYPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	9.30E+01	5.38E-02
91-57-6	2-METHYLNAPHTHALENE	ug/L	4.72E+00	5.68E+00	2.84E+00	3.60E+00	7.89E-01
88-74-4	2-NITROANILINE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.90E+01	1.49E-01
88-75-5	2-NITROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
91-94-1	**3,3`-DICHLOROBENZIDINE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**1.30E-01**	**3.85E+01**
99-09-2	3-NITROANILINE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
534-52-1	**4,6-DINITRO-2-METHYLPHENOL**	**ug/L**	**9.43E+00**	**1.14E+01**	**5.70E+00**	**1.50E-01**	**3.80E+01**
101-55-3	4-BROMOPHENYL PHENYL ETHER	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	1.40E+02	2.03E-02
106-47-8	**4-CHLOROANILINE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**3.70E-01**	**1.35E+01**
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
106-44-5	4-METHLYPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	1.90E+02	2.63E-02
100-01-6	**4-NITROANILINE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**3.80E+00**	**1.32E+00**
100-02-7	4-NITROPHENOL	ug/L	9.43E+00	1.14E+01	5.70E+00	NV	N/A

TABLE E.11
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
83-32-9	ACENAPHTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	5.30E+01	5.36E-02
208-96-8	ACENAPHTHYLENE	ug/L	4.72E+00	5.68E+00	2.84E+00	5.30E+01	5.36E-02
98-86-2	ACETOPHENONE	ug/L	4.72E+00	1.00E+01	5.00E+00	1.90E+02	2.63E-02
120-12-7	ANTHRACENE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.80E+02	1.58E-02
1912-24-9	**ATRAZINE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**3.00E-01**	**1.67E+01**
100-52-7	BENZALDEHYDE	ug/L	4.72E+00	1.00E+01	5.00E+00	1.90E+01	2.63E-01
56-55-3	**BENZO[A]ANTHRACENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**3.00E-02**	**9.47E+01**
50-32-8	**BENZO[A]PYRENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**2.50E-02**	**1.14E+02**
205-99-2	**BENZO[B]FLUORANTHENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**2.50E-01**	**1.14E+01**
191-24-2	BENZO[G,H,I]PERYLENE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.20E+01	2.37E-01
207-08-9	**BENZO[K]FLUORANTHENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**2.50E+00**	**1.14E+00**
85-68-7	BENZYL BUTYL PHTHALATE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.60E+01	1.78E-01
92-52-4	**BIPHENYL**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**8.30E-02**	**3.42E+01**
111-91-1	BIS(2-CHLOROETHOXY)METHANE	ug/L	4.72E+00	5.68E+00	2.84E+00	5.90E+00	4.81E-01
111-44-4	**BIS(2-CHLOROETHYL) ETHER**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**1.40E-02**	**3.57E+02**
86-74-8	CARBAZOLE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
218-01-9	CHRYSENE	ug/L	4.72E+00	5.68E+00	2.84E+00	2.50E+01	1.14E-01
53-70-3	**DIBENZ[A,H]ANTHRACENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**2.50E-02**	**1.14E+02**
132-64-9	**DIBENZOFURAN**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**7.90E-01**	**3.59E+00**
84-74-2	DI-N-BUTYL PHTHALATE	ug/L	4.72E+00	5.68E+00	2.84E+00	9.00E+01	3.16E-02
117-84-0	DI-N-OCTYL PHTHALATE	ug/L	4.72E+00	1.00E+01	5.00E+00	2.00E+01	2.50E-01
206-44-0	FLUORANTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	8.00E+01	3.55E-02
86-73-7	FLUORENE	ug/L	4.72E+00	5.68E+00	2.84E+00	2.90E+01	9.79E-02
118-74-1	**HEXACHLOROBENZENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**9.80E-03**	**2.90E+02**
87-68-3	**HEXACHLOROBUTADIENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.40E-01**	**2.03E+01**
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**4.10E-02**	**1.22E+02**
67-72-1	**HEXACHLOROETHANE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**3.30E-01**	**8.61E+00**
193-39-5	**INDENO[1,2,3-CD]PYRENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**2.50E-01**	**1.14E+01**
78-59-1	ISOPHORONE	ug/L	4.72E+00	5.68E+00	2.84E+00	7.80E+01	3.64E-02
62-75-9	**METHANAMINE, N-METHYL-N-NITROSO**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.10E-04**	**2.58E+04**
98-95-3	**NITROBENZENE**	**ug/L**	**2.00E-01**	**5.68E+00**	**2.84E+00**	**1.40E-01**	**2.03E+01**
621-64-7	**N-NITROSODI-N-PROPYLAMINE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.10E-02**	**2.58E+02**

TABLE E.11
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
86-30-6	N-NITROSODIPHENYLAMINE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.20E+01	2.37E-01
87-86-5	**PENTACHLOROPHENOL**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**4.10E-02**	**1.22E+02**
85-01-8	PHENANTHRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.20E+01	2.37E-01
129-00-0	PYRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	1.20E+01	2.37E-01
72-54-8	**4,4'-DDD**	**ug/L**	**9.30E-02**	**2.00E-01**	**1.00E-01**	**3.20E-02**	**3.13E+00**
72-55-9	**4,4'-DDE**	**ug/L**	**9.30E-02**	**2.00E-01**	**1.00E-01**	**4.60E-02**	**2.17E+00**
50-29-3	4,4'-DDT	ug/L	9.30E-02	2.00E-01	1.00E-01	2.30E-01	4.35E-01
309-00-2	**ALDRIN**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**9.20E-04**	**5.43E+01**
319-84-6	**ALPHA-BHC**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**7.20E-03**	**6.94E+00**
319-85-7	**BETA-BHC**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**2.50E-02**	**2.00E+00**
12789-03-6	**CHLORDANE [4]**	**ug/L**	**9.40E-02**	**2.00E-01**	**1.00E-01**	**2.00E-02**	**5.00E+00**
319-86-8	**DELTA-BHC**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**2.50E-02 [5]**	**2.00E+00**
60-57-1	**DIELDRIN**	**ug/L**	**9.30E-02**	**2.00E-01**	**1.00E-01**	**1.80E-03**	**5.56E+01**
959-98-8	ENDOSULFAN I	ug/L	4.70E-02	1.00E-01	5.00E-02	1.00E+01	5.00E-03
33213-65-9	ENDOSULFAN II	ug/L	9.30E-02	2.00E-01	1.00E-01	1.00E+01	1.00E-02
1031-07-8	ENDOSULFAN SULFATE	ug/L	9.30E-02	2.00E-01	1.00E-01	1.00E+01	1.00E-02
72-20-8	ENDRIN	ug/L	9.30E-02	2.00E-01	1.00E-01	2.30E-01	4.35E-01
7421-93-4	ENDRIN ALDEHYDE	ug/L	9.30E-02	2.00E-01	1.00E-01	2.30E-01	4.35E-01
53494-70-5	ENDRIN KETONE	ug/L	9.30E-02	2.00E-01	1.00E-01	2.30E-01	4.35E-01
58-89-9	**GAMMA-BHC (LINDANE)**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**4.20E-02**	**1.19E+00**
76-44-8	**HEPTACHLOR**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**1.40E-03**	**3.57E+01**
1024-57-3	**HEPTACHLOR EPOXIDE**	**ug/L**	**4.70E-02**	**1.00E-01**	**5.00E-02**	**1.40E-03**	**3.57E+01**
72-43-5	METHOXYCHLOR	ug/L	4.67E-01	1.00E+00	5.00E-01	3.70E+00	1.35E-01
8001-35-2	**TOXAPHENE**	**ug/L**	**4.67E+00**	**1.00E+01**	**5.00E+00**	**7.10E-02**	**7.04E+01**
12674-11-2	**AROCLOR-1016**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**1.40E-01**	**7.14E+00**
11104-28-2	**AROCLOR-1221**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**4.70E-03**	**2.13E+02**
11141-16-5	**AROCLOR-1232**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**4.70E-03**	**2.13E+02**
53469-21-9	**AROCLOR-1242**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03**	**1.28E+02**
12672-29-6	**AROCLOR-1248**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03**	**1.28E+02**
11097-69-1	**AROCLOR-1254**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03**	**1.28E+02**
11096-82-5	**AROCLOR-1260**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03**	**1.28E+02**

TABLE E.11
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

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

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
37324-23-5	**AROCLOR-1262**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03 [6]**	**1.28E+02**
11100-14-4	**PCB-1268 (AROCLOR 1268)**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**7.80E-03 [6]**	**1.28E+02**

[1] Set at 1/2 maximum CRQL
[2] The EPA Regional Screening Level (RSL) for Tapwater November 2017 (cancer risk 1E-06, non-cancer HQ = 0.1)
[3] RSL for unspecified 1,3-dichloropropene
[4] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs
[5] RSL for hexachlorocyclohexane, technical
[6] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.12
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Building Surfaces
Exposure Medium: Dust

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
12674-11-2	AROCLOR-1016	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
11104-28-2	AROCLOR-1221	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
11141-16-5	AROCLOR-1232	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
53469-21-9	AROCLOR-1242	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
11097-69-1	AROCLOR-1254	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
37324-23-5	AROCLOR-1262	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05
11100-14-4	PCB-1268 (AROCLOR 1268)	ug/100 cm^2	1.55E-03	1.55E-03	7.75E-04	1.00E+01	7.75E-05

[1] Sample results were originally reported in ug/wipe and were converted to ug/100 cm^2 to parallel the units of the screening value for Aroclors.

[2] Set at 1/2 maximum CRQL

[3] PCB screening criteria from the Toxic Substance Control Act, high occupancy areas.

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
75-34-3	1,1-DICHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	3.60E+01	2.22E-04
75-35-4	1,1-DICHLOROETHYLENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.30E+02	3.48E-05
71-55-6	1,1,1-TRICHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	8.10E+03	9.88E-07
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.70E+03	1.19E-06
79-00-5	1,1,2-TRICHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.50E+00	5.33E-03
79-34-5	1,1,2,2-TETRACHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.00E+00	1.33E-03
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	mg/kg	1.10E-02	1.60E-02	8.00E-03	5.30E-02	1.51E-01
106-93-4	1,2-DIBROMOETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	3.60E-01	2.22E-02
95-50-1	1,2-DICHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.80E+03	4.44E-06
107-06-2	1,2-DICHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	4.60E+00	1.74E-03
78-87-5	1,2-DICHLOROPROPANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.80E+00	2.86E-03
87-61-6	1,2,3-TRICHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.30E+01	1.27E-04
120-82-1	1,2,4-TRICHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	5.80E+01	1.38E-04
541-73-1	1,3-DICHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	NV	N/A
106-46-7	1,4-DICHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.60E+01	3.08E-04
78-93-3	2-BUTANONE	mg/kg	2.20E-02	3.20E-02	1.60E-02	2.70E+04	5.93E-07
591-78-6	2-HEXANONE	mg/kg	2.20E-02	3.20E-02	1.60E-02	2.00E+02	8.00E-05
108-10-1	4-METHYL-2-PENTANONE	mg/kg	2.20E-02	3.20E-02	1.60E-02	3.30E+04	4.85E-07
67-64-1	ACETONE	mg/kg	2.20E-02	3.20E-02	1.60E-02	6.10E+04	2.62E-07
71-43-2	BENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.20E+01	6.67E-04
75-27-4	BROMODICHLOROMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.90E+00	2.76E-03
75-25-2	BROMOFORM	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.90E+02	4.21E-05
74-83-9	BROMOMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.80E+00	1.18E-03
75-15-0	CARBON DISULFIDE	mg/kg	1.10E-02	1.60E-02	8.00E-03	7.70E+02	1.04E-05
56-23-5	CARBON TETRACHLORIDE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.50E+00	1.23E-03
108-90-7	CHLOROBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.80E+02	2.86E-05
74-97-5	CHLOROBROMOMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.50E+02	5.33E-05
75-00-3	CHLOROETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.40E+04	5.71E-07
67-66-3	CHLOROFORM	mg/kg	1.10E-02	3.00E-02	1.50E-02	3.20E+00	4.69E-03
74-87-3	CHLOROMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.10E+02	7.27E-05
156-59-2	CIS-1,2-DICHLOROETHENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.60E+02	5.00E-05

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.80E+01 [3]	4.44E-04
110-82-7	CYCLOHEXANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.50E+03	1.23E-06
124-48-1	DIBROMOCHLOROMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	8.30E+01	9.64E-05
75-71-8	DICHLORODIFLUOROMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	8.70E+01	9.20E-05
100-41-4	ETHYLBENZENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	5.80E+01	1.38E-04
98-82-8	ISOPROPYLBENZENE (CUMENE)	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.90E+03	4.21E-06
79-20-9	METHYL ACETATE	mg/kg	1.10E-02	1.60E-02	8.00E-03	7.80E+04	1.03E-07
1634-04-4	METHYL TERT-BUTYL ETHER	mg/kg	1.10E-02	1.60E-02	8.00E-03	4.70E+02	1.70E-05
108-87-2	METHYLCYLOHEXANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	NV	N/A
75-09-2	METHYLENE CHLORIDE	mg/kg	1.10E-02	1.60E-02	8.00E-03	3.50E+02	2.29E-05
179601-23-1	m,p-Xylene	mg/kg	1.10E-02	1.60E-02	8.00E-03	5.50E+02 [4]	1.45E-05
95-47-6	o-Xylene	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.50E+02	1.23E-05
100-42-5	STYRENE (MONOMER)	mg/kg	1.10E-02	1.60E-02	8.00E-03	6.00E+03	1.33E-06
127-18-4	TETRACHLOROETHYLENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	8.10E+01	9.88E-05
108-88-3	TOLUENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	4.90E+03	1.63E-06
156-60-5	TRANS-1,2-DICHLOROETHENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.60E+03	5.00E-06
10061-02-6	TRANS-1,3-DICHLOROPROPENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	1.80E+01 [3]	4.44E-04
79-01-6	TRICHLOROETHYLENE	mg/kg	1.10E-02	1.60E-02	8.00E-03	4.10E+00	1.95E-03
75-69-4	TRICHLOROFLUOROMETHANE	mg/kg	1.10E-02	1.60E-02	8.00E-03	2.30E+04	3.48E-07
75-01-4	VINYL CHLORIDE	mg/kg	1.10E-02	1.60E-02	8.00E-03	5.90E-01	1.36E-02
95-94-3	1,2,4,5-TETRACHLOROBENZENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	2.30E+01	1.67E-02
123-91-1	1,4-DIOXANE	mg/kg	1.10E-01	3.00E-01	1.50E-01	5.30E+01	2.83E-03
91-58-7	2-CHLORONAPHTHALENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	4.80E+03	8.02E-05
95-57-8	2-CHLOROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	3.90E+02	9.87E-04
95-48-7	2-METHLYPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	3.20E+03	2.34E-04
91-57-6	2-METHYLNAPHTHALENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	2.40E+02	1.60E-03
88-74-4	2-NITROANILINE	mg/kg	2.80E-01	7.70E-01	3.85E-01	6.30E+02	6.11E-04
88-75-5	2-NITROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	mg/kg	5.40E-01	1.50E+00	7.50E-01	3.10E+03	2.42E-04
58-90-2	2,3,4,6-TETRACHLOROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.90E+03	2.03E-04
120-83-2	2,4-DICHLOROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.90E+02	2.03E-03

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
105-67-9	2,4-DIMETHYLPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.30E+03	2.96E-04
51-28-5	2,4-DINITROPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.30E+02	5.77E-03
121-14-2	2,4-DINITROTOLUENE	mg/kg	2.50E-01	7.70E-01	3.85E-01	1.70E+01	2.26E-02
95-95-4	2,4,5-TRICHLOROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	6.30E+03	6.11E-05
88-06-2	2,4,6-TRICHLOROPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	6.30E+01	6.11E-03
606-20-2	2,6-DINITROTOLUENE	mg/kg	2.50E-01	7.70E-01	3.85E-01	3.60E+00	1.07E-01
99-09-2	3-NITROANILINE	mg/kg	5.40E-01	1.50E+00	7.50E-01	NV	N/A
91-94-1	3,3'-DICHLOROBENZIDINE	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.20E+01	6.25E-02
101-55-3	4-BROMOPHENYL PHENYL ETHER	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	mg/kg	2.80E-01	7.70E-01	3.85E-01	6.30E+03	6.11E-05
106-47-8	4-CHLOROANILINE	mg/kg	5.40E-01	1.50E+00	7.50E-01	2.70E+01	2.78E-02
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
106-44-5	4-METHYLPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	6.30E+03	1.19E-04
100-01-6	4-NITROANILINE	mg/kg	5.40E-01	1.50E+00	7.50E-01	2.50E+02	3.00E-03
100-02-7	4-NITROPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	5.10E+00	1.47E-01
83-32-9	ACENAPHTHENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	3.60E+03	1.07E-04
208-96-8	ACENAPHTHYLENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
98-86-2	ACETOPHENONE	mg/kg	5.40E-01	1.50E+00	7.50E-01	7.80E+03	9.62E-05
120-12-7	ANTHRACENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.80E+04	2.14E-05
1912-24-9	ATRAZINE	mg/kg	5.40E-01	1.50E+00	7.50E-01	2.40E+01	3.13E-02
100-52-7	BENZALDEHYDE	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.70E+03	4.41E-04
56-55-3	BENZO[A]ANTHRACENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+01	3.50E-02
50-32-8	BENZO[A]PYRENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+00	3.50E-01
191-24-2	BENZO[G,H,I]PERYLENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
207-08-9	BENZO[K]FLUORANTHENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+02	3.50E-03
92-52-4	BIPHENYL	mg/kg	2.80E-01	7.70E-01	3.85E-01	4.70E+01	8.19E-03
111-91-1	BIS(2-CHLOROETHOXY) METHANE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.90E+02	2.03E-03
111-44-4	BIS(2-CHLOROETHYL) ETHER	mg/kg	5.40E-01	1.50E+00	7.50E-01	2.30E+00	3.26E-01
105-60-2	CAPROLACTAM	mg/kg	5.40E-01	1.50E+00	7.50E-01	3.10E+04	2.42E-05
86-74-8	CARBAZOLE	mg/kg	5.40E-01	1.50E+00	7.50E-01	NV	N/A

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
218-01-9	CHRYSENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+03	3.50E-04
117-84-0	DI-N-OCTYL PHTHALATE	mg/kg	5.40E-01	1.50E+00	7.50E-01	6.30E+02	1.19E-03
53-70-3	DIBENZ[A,H]ANTHRACENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+00	3.50E-01
132-64-9	DIBENZOFURAN	mg/kg	2.80E-01	7.70E-01	3.85E-01	7.30E+01	5.27E-03
84-66-2	DIETHYL PHTHALATE	mg/kg	2.80E-01	7.70E-01	3.85E-01	5.10E+04	7.55E-06
131-11-3	DIMETHYL PHTHALATE	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
86-73-7	FLUORENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	2.40E+03	1.60E-04
118-74-1	HEXACHLOROBENZENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	2.10E+00	1.83E-01
87-68-3	HEXACHLOROBUTADIENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.20E+01	3.21E-02
77-47-4	HEXACHLOROCYCLOPENTADIENE	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.80E+00	4.17E-01
67-72-1	HEXACHLOROETHANE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.80E+01	2.14E-02
193-39-5	INDENO[1,2,3-CD]PYRENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+01	3.50E-02
78-59-1	ISOPHORONE	mg/kg	2.80E-01	7.70E-01	3.85E-01	5.70E+03	6.75E-05
621-64-7	N-NITROSODI-N-PROPYLAMINE	mg/kg	2.80E-01	7.70E-01	3.85E-01	7.80E-01	4.94E-01
86-30-6	N-NITROSODIPHENYLAMINE	mg/kg	2.80E-01	7.70E-01	3.85E-01	1.10E+03	3.50E-04
91-20-3	NAPHTHALENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	3.80E+01	1.01E-02
98-95-3	NITROBENZENE	mg/kg	2.50E-01	7.70E-01	3.85E-01	5.10E+01	7.55E-03
87-86-5	PENTACHLOROPHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.00E+01	7.50E-02
85-01-8	PHENANTHRENE	mg/kg	2.80E-01	7.70E-01	3.85E-01	NV	N/A
108-95-2	PHENOL	mg/kg	5.40E-01	1.50E+00	7.50E-01	1.90E+04	3.95E-05
72-54-8	4,4'-DDD	mg/kg	5.45E-03	1.49E-02	7.45E-03	2.30E+01	3.24E-04
72-55-9	4,4'-DDE	mg/kg	5.45E-03	1.49E-02	7.45E-03	2.00E+01	3.73E-04
50-29-3	4,4'-DDT	mg/kg	5.45E-03	1.49E-02	7.45E-03	1.90E+01	3.92E-04
309-00-2	ALDRIN	mg/kg	2.81E-03	7.65E-03	3.83E-03	3.90E-01	9.81E-03
319-84-6	ALPHA-BHC	mg/kg	2.81E-03	7.65E-03	3.83E-03	8.60E-01	4.45E-03
319-85-7	BETA-BHC	mg/kg	2.81E-03	7.65E-03	3.83E-03	3.00E+00	1.28E-03
12789-03-6	CHLORDANE [5]	mg/kg	5.62E-03	1.53E-02	7.65E-03	1.70E+01	4.50E-04
319-86-8	DELTA-BHC	mg/kg	2.81E-03	7.65E-03	3.83E-03	3.00E+00 [6]	1.28E-03
60-57-1	DIELDRIN	mg/kg	5.45E-03	1.49E-02	7.45E-03	3.40E-01	2.19E-02
959-98-8	ENDOSULFAN I	mg/kg	2.81E-03	7.65E-03	3.83E-03	4.70E+02 [7]	8.14E-06
33213-65-9	ENDOSULFAN II	mg/kg	5.45E-03	1.49E-02	7.45E-03	4.70E+02 [7]	1.59E-05

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
1031-07-8	ENDOSULFAN SULFATE	mg/kg	5.45E-03	1.49E-02	7.45E-03	4.70E+02 [7]	1.59E-05
72-20-8	ENDRIN	mg/kg	5.45E-03	1.49E-02	7.45E-03	1.90E+01	3.92E-04
7421-93-4	ENDRIN ALDEHYDE	mg/kg	5.45E-03	1.49E-02	7.45E-03	1.90E+01 [8]	3.92E-04
53494-70-5	ENDRIN KETONE	mg/kg	5.45E-03	1.49E-02	7.45E-03	1.90E+01 [8]	3.92E-04
58-89-9	GAMMA-BHC (LINDANE)	mg/kg	2.81E-03	7.65E-03	3.83E-03	5.70E+00	6.71E-04
76-44-8	HEPTACHLOR	mg/kg	2.81E-03	7.65E-03	3.83E-03	1.30E+00	2.94E-03
1024-57-3	HEPTACHLOR EPOXIDE	mg/kg	2.81E-03	7.65E-03	3.83E-03	7.00E-01	5.46E-03
72-43-5	METHOXYCHLOR	mg/kg	2.81E-02	7.65E-02	3.83E-02	3.20E+02	1.20E-04
8001-35-2	TOXAPHENE	mg/kg	2.81E-01	7.65E-01	3.83E-01	4.90E+00	7.81E-02
12674-11-2	AROCLOR-1016	mg/kg	5.40E-02	1.50E-01	7.50E-02	4.10E+00	1.83E-02
11104-28-2	AROCLOR-1221	mg/kg	5.40E-02	1.50E-01	7.50E-02	2.00E+00	3.75E-02
11141-16-5	AROCLOR-1232	mg/kg	5.40E-02	1.50E-01	7.50E-02	1.70E+00	4.41E-02
53469-21-9	AROCLOR-1242	mg/kg	5.40E-02	1.50E-01	7.50E-02	2.30E+00	3.26E-02
12672-29-6	AROCLOR-1248	mg/kg	5.40E-02	1.50E-01	7.50E-02	2.30E+00	3.26E-02
11097-69-1	AROCLOR-1254	mg/kg	5.40E-02	1.50E-01	7.50E-02	1.20E+00	6.25E-02
37324-23-5	AROCLOR-1262	mg/kg	5.40E-02	1.50E-01	7.50E-02	2.40E+00 [9]	3.13E-02
11100-14-4	PCB-1268 (AROCLOR-1268)	mg/kg	5.40E-02	1.50E-01	7.50E-02	2.40E+00 [9]	3.13E-02
99-35-4	1,3,5-TRINITROBENZENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	2.20E+03	5.68E-05
35572-78-2	2-AMINO-4,6-DINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	1.50E+02	8.33E-04
88-72-2	2-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.20E+01	3.91E-03
118-96-7	2,4,6-TRINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.60E+01	3.47E-03
99-08-1	3-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.30E+00	1.98E-02
19406-51-0	4-AMINO-2,6-DINITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	1.50E+02	8.33E-04
99-99-0	4-NITROTOLUENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	2.50E+02	5.00E-04
18540-29-9	CHROMIUM (HEXAVALENT COMPOUNDS)	mg/kg	1.17E+00	1.38E+00	6.90E-01	3.00E+00	2.30E-01
99-65-0	M-DINITROBENZENE	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.30E+00	1.98E-02
2691-41-0	OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE (HMX)	mg/kg	2.50E-01	2.50E-01	1.25E-01	3.90E+03	3.21E-05
121-82-4	RDX	mg/kg	2.50E-01	2.50E-01	1.25E-01	6.10E+01	2.05E-03

TABLE E.13
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Current/Future
Medium: Cradock Community Sediment
Exposure Medium: Sediment

CAS Number	Chemical	Units	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [1]	Screening Toxicity Value [2]	Ratio of Screening Concentration to Screening Value
7782-49-2	SELENIUM	mg/kg	3.10E+00	8.80E+00	4.40E+00	3.90E+02	1.13E-02
57-12-5	CYANIDE	mg/kg	4.90E-01	1.60E+00	8.00E-01	2.30E+01	3.48E-02
10098-97-2	STRONTIUM-90	pCi/g	2.58E-01	8.10E-01	4.05E-01	3.13E+01	1.29E-02

[1] Set at 1/2 maximum CRQL
[2] EPA Regional Screening Level (RSL) for residential soil November 2017 (cancer risk 1E-05, non-cancer HQ = 1.0)
[3] RSL for unspecified 1,3-dichloropropene
[4] RSL for m-xylene
[5] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs
[6] RSL for hexachlorocyclohexane, technical
[7] RSL for endosulfan
[8] RSL for endrin
[9] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable

TABLE E.14
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
71-55-6	1,1,1-TRICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.42E+02	3.37E-03
79-34-5	1,1,2,2-TETRACHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.23E+00	7.74E-01
76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.42E+01	1.03E-01
79-00-5	**1,1,2-TRICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**6.19E-01**	**4.04E+00**
75-34-3	1,1-DICHLOROETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	7.64E+00	3.27E-01
75-35-4	1,1-DICHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.95E+01	1.28E-01
87-61-6	1,2,3-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
120-82-1	1,2,4-TRICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.59E+00	6.96E-01
96-12-8	**1,2-DIBROMO-3-CHLOROPROPANE (DBCP)**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.81E-02**	**8.90E+01**
106-93-4	**1,2-DIBROMOETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.76E-01**	**1.42E+01**
95-50-1	1,2-DICHLOROBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.66E+02	9.40E-03
107-06-2	**1,2-DICHLOROETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**2.24E+00**	**1.12E+00**
78-87-5	1,2-DICHLOROPROPANE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.62E+00	6.91E-01
591-78-6	2-HEXANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	8.21E+02	6.09E-03
108-10-1	4-METHYL-2-PENTANONE	ug/L	1.00E+01	1.00E+01	5.00E+00	5.55E+04	9.01E-05
71-43-2	**BENZENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.59E+00**	**1.57E+00**
75-27-4	**BROMODICHLOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.76E-01**	**2.85E+00**
75-25-2	BROMOFORM	ug/L	5.00E+00	5.00E+00	2.50E+00	1.17E+02	2.14E-02
74-83-9	**BROMOMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**1.74E+00**	**1.44E+00**
56-23-5	**CARBON TETRACHLORIDE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**4.15E-01**	**6.02E+00**
74-97-5	CHLOROBROMOMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	6.99E+01	3.58E-02
67-66-3	**CHLOROFORM**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**8.14E-01**	**3.07E+00**
74-87-3	CHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	2.60E+01	9.62E-02
10061-01-5	CIS-1,3-DICHLOROPROPYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.84E+00 [4]	5.17E-01
110-82-7	CYCLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	1.02E+02	2.45E-02
124-48-1	DIBROMOCHLOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-71-8	**DICHLORODIFLUOROMETHANE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**7.44E-01**	**3.36E+00**
100-41-4	ETHYLBENZENE	ug/L	5.00E+00	5.00E+00	2.50E+00	3.49E+00	7.16E-01
98-82-8	ISOPROPYLBENZENE (CUMENE)	ug/L	5.00E+00	5.00E+00	2.50E+00	8.87E+01	2.82E-02
108-87-2	METHYLCYLOHEXANE	ug/L	5.00E+00	5.00E+00	2.50E+00	NV	N/A
75-09-2	METHYLENE CHLORIDE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.71E+02	5.31E-03

TABLE E.14
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
100-42-5	STYRENE (MONOMER)	ug/L	5.00E+00	5.00E+00	2.50E+00	9.28E+02	2.69E-03
127-18-4	TETRACHLOROETHYLENE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.76E+00	4.34E-01
10061-02-6	TRANS-1,3-DICHLOROPROPENE	ug/L	5.00E+00	5.00E+00	2.50E+00	4.84E+00 [4]	5.17E-01
79-01-6	**TRICHLOROETHYLENE**	**ug/L**	**5.00E+00**	**5.00E+00**	**2.50E+00**	**5.18E-01**	**4.83E+00**
75-69-4	TRICHLOROFLUOROMETHANE	ug/L	5.00E+00	5.00E+00	2.50E+00	5.76E+00	4.34E-01
95-94-3	1,2,4,5-TETRACHLOROBENZENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
123-91-1	1,4-DIOXANE	ug/L	2.00E+00	2.00E+00	1.00E+00	2.86E+03	3.50E-04
108-60-1	2,2'-OXYBIS(1-CHLOROPROPANE)	ug/L	1.00E+01	1.00E+01	5.00E+00	NV	N/A
39638-32-9	2,2-OXYBIS(2-CHLOROPROPANE)	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
58-90-2	2,3,4,6-TETRACHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
95-95-4	2,4,5-TRICHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
88-06-2	2,4,6-TRICHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
120-83-2	2,4-DICHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
105-67-9	2,4-DIMETHYLPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
51-28-5	2,4-DINITROPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
121-14-2	2,4-DINITROTOLUENE	ug/L	2.00E-01	5.68E+00	2.84E+00	Not volatile	N/A
606-20-2	2,6-DINITROTOLUENE	ug/L	2.00E-01	5.68E+00	2.84E+00	Not volatile	N/A
91-58-7	2-CHLORONAPHTHALENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
95-57-8	2-CHLOROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
95-48-7	2-METHLYPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
91-57-6	2-METHYLNAPHTHALENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
88-74-4	2-NITROANILINE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
88-75-5	2-NITROPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
91-94-1	3,3`-DICHLOROBENZIDINE	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
99-09-2	3-NITROANILINE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
534-52-1	4,6-DINITRO-2-METHYLPHENOL	ug/L	9.43E+00	1.14E+01	5.70E+00	Not volatile	N/A
101-55-3	4-BROMOPHENYL PHENYL ETHER	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
59-50-7	4-CHLORO-3-METHYLPHENOL	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
106-47-8	4-CHLOROANILINE	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
7005-72-3	4-CHLOROPHENYL PHENYL ETHER	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
106-44-5	4-METHLYPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A

TABLE E.14
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
100-01-6	4-NITROANILINE	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
100-02-7	4-NITROPHENOL	ug/L	9.43E+00	1.14E+01	5.70E+00	NV	N/A
83-32-9	ACENAPHTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
208-96-8	ACENAPHTHYLENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
98-86-2	ACETOPHENONE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
120-12-7	ANTHRACENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
1912-24-9	ATRAZINE	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
100-52-7	BENZALDEHYDE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
56-55-3	BENZO[A]ANTHRACENE	ug/L	4.72E+00	5.68E+00	2.84E+00	3.44E+01	8.26E-02
50-32-8	BENZO[A]PYRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
205-99-2	BENZO[B]FLUORANTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
191-24-2	BENZO[G,H,I]PERYLENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
207-08-9	BENZO[K]FLUORANTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
85-68-7	BENZYL BUTYL PHTHALATE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
92-52-4	BIPHENYL	ug/L	4.72E+00	5.68E+00	2.84E+00	3.31E+00	8.58E-01
111-91-1	BIS(2-CHLOROETHOXY)METHANE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
111-44-4	BIS(2-CHLOROETHYL) ETHER	ug/L	4.72E+00	1.00E+01	5.00E+00	1.22E+01	4.10E-01
86-74-8	CARBAZOLE	ug/L	4.72E+00	1.00E+01	5.00E+00	NV	N/A
218-01-9	CHRYSENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
53-70-3	DIBENZ[A,H]ANTHRACENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
132-64-9	DIBENZOFURAN	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
84-74-2	DI-N-BUTYL PHTHALATE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
117-84-0	DI-N-OCTYL PHTHALATE	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
206-44-0	FLUORANTHENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
86-73-7	FLUORENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
118-74-1	**HEXACHLOROBENZENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**8.78E-02**	**3.23E+01**
87-68-3	**HEXACHLOROBUTADIENE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**3.03E-01**	**9.37E+00**
77-47-4	**HEXACHLOROCYCLOPENTADIENE**	**ug/L**	**4.72E+00**	**1.00E+01**	**5.00E+00**	**1.89E-02**	**2.65E+02**
67-72-1	**HEXACHLOROETHANE**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**1.60E+00**	**1.78E+00**
193-39-5	INDENO[1,2,3-CD]PYRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
78-59-1	ISOPHORONE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A

TABLE E.14
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
62-75-9	**METHANAMINE, N-METHYL-N-NITROSO**	**ug/L**	**4.72E+00**	**5.68E+00**	**2.84E+00**	**9.73E-01**	**2.92E+00**
98-95-3	NITROBENZENE	ug/L	2.00E-01	5.68E+00	2.84E+00	7.15E+01	3.97E-02
621-64-7	N-NITROSODI-N-PROPYLAMINE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
86-30-6	N-NITROSODIPHENYLAMINE	ug/L	4.72E+00	5.68E+00	2.84E+00	Not volatile	N/A
87-86-5	PENTACHLOROPHENOL	ug/L	4.72E+00	1.00E+01	5.00E+00	Not volatile	N/A
85-01-8	PHENANTHRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
129-00-0	PYRENE	ug/L	4.72E+00	5.68E+00	2.84E+00	NV	N/A
72-54-8	4,4'-DDD	ug/L	9.30E-02	2.00E-01	1.00E-01	Not volatile	N/A
72-55-9	4,4'-DDE	ug/L	9.30E-02	2.00E-01	1.00E-01	1.70E+01	5.88E-03
50-29-3	4,4'-DDT	ug/L	9.30E-02	2.00E-01	1.00E-01	Not volatile	N/A
309-00-2	ALDRIN	ug/L	4.70E-02	1.00E-01	5.00E-02	3.19E-01	1.57E-01
319-84-6	ALPHA-BHC	ug/L	4.70E-02	1.00E-01	5.00E-02	Not volatile	N/A
319-85-7	BETA-BHC	ug/L	4.70E-02	1.00E-01	5.00E-02	Not volatile	N/A
12789-03-6	CHLORDANE [4]	ug/L	9.40E-02	2.00E-01	1.00E-01	1.41E+01	7.09E-03
319-86-8	DELTA-BHC	ug/L	4.70E-02	1.00E-01	5.00E-02	NV [5]	N/A
60-57-1	DIELDRIN	ug/L	9.30E-02	2.00E-01	1.00E-01	Not volatile	N/A
959-98-8	ENDOSULFAN I	ug/L	4.70E-02	1.00E-01	5.00E-02	NV	N/A
33213-65-9	ENDOSULFAN II	ug/L	9.30E-02	2.00E-01	1.00E-01	NV	N/A
1031-07-8	ENDOSULFAN SULFATE	ug/L	9.30E-02	2.00E-01	1.00E-01	Not volatile	N/A
72-20-8	ENDRIN	ug/L	9.30E-02	2.00E-01	1.00E-01	Not volatile	N/A
7421-93-4	ENDRIN ALDEHYDE	ug/L	9.30E-02	2.00E-01	1.00E-01	NV	N/A
53494-70-5	ENDRIN KETONE	ug/L	9.30E-02	2.00E-01	1.00E-01	NV	N/A
58-89-9	GAMMA-BHC (LINDANE)	ug/L	4.70E-02	1.00E-01	5.00E-02	Not volatile	N/A
76-44-8	HEPTACHLOR	ug/L	4.70E-02	1.00E-01	5.00E-02	1.80E-01	2.78E-01
1024-57-3	HEPTACHLOR EPOXIDE	ug/L	4.70E-02	1.00E-01	5.00E-02	1.26E+00	3.97E-02
72-43-5	METHOXYCHLOR	ug/L	4.67E-01	1.00E+00	5.00E-01	Not volatile	N/A
8001-35-2	TOXAPHENE	ug/L	4.67E+00	1.00E+01	5.00E+00	Not volatile	N/A
12674-11-2	AROCLOR-1016	ug/L	9.35E-01	2.00E+00	1.00E+00	1.72E+01	5.81E-02
11104-28-2	**AROCLOR-1221**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**5.27E-01**	**1.90E+00**
11141-16-5	**AROCLOR-1232**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**1.63E-01**	**6.13E+00**
53469-21-9	**AROCLOR-1242**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**3.50E-01**	**2.86E+00**

TABLE E.14
EVALUATION OF ANALYTES NOT DETECTED IN ANY SAMPLE

Scenario Timeframe: Future
Medium: Air
Exposure Medium: Groundwater
Exposure Point: Indoor Air (Vapor Intrusion)

CAS Number	Chemical	Units [1]	Minimum CRQL	Maximum CRQL	Concentration Used for Screening [2]	Screening Toxicity Value [3]	Ratio of Screening Concentration to Screening Value
12672-29-6	**AROCLOR-1248**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**2.73E-01**	**3.66E+00**
11097-69-1	**AROCLOR-1254**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**4.25E-01**	**2.35E+00**
11096-82-5	**AROCLOR-1260**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**3.58E-01**	**2.79E+00**
37324-23-5	**AROCLOR-1262**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**3.58E-01 [6]**	**2.79E+00**
11100-14-4	**AROCLOR-1268**	**ug/L**	**9.35E-01**	**2.00E+00**	**1.00E+00**	**3.58E-01 [6]**	**2.79E+00**

[1] Set at 1/2 maximum CRQL

[2] Target Groundwater Concentration (cancer risk 1E-06, non-cancer HQ = 0.1) obtained from the VISL calculator (Version 3.5, June 2017) and in accordance with OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air (EPA, 2015).

[3] RSL for unspecified 1,3-dichloropropene

[4] CRQLs and concentration used for screening calculated using the sum of the alpha-chlordane and gamma-chlordane CRQLs

[5] RSL for hexachlorocyclohexane, technical

[6] RSL for Arooclor-1260 used as a proxy

Values in bold indicate analytes with 1/2 maximum CRQL > screening value

NV = No screening value
N/A = Not applicable